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ABSTRACT

This workbook on first aid is one of a series of nine individual units of instruction for roofing apprenticeship classes in California. The workbook covers 12 topics: introduction to first-aid practices; burns; skeletal injuries; spinal injuries; wounds, bleeding, and bruises; emergencies of the heart and blood circulation system; breathing and airway maintenance; head injuries, unconsciousness, fainting, and convulsions; shock; medical emergencies; injuries to the eyes, ears, and nose; and bites and stings. For each topic, student learning objectives and information sheets with line illustrations are given; multiple choice tests corresponding to the topics are provided for teacher use in evaluating student progress. (No answers are given.) Workbook appendixes include safety tips for working with hotstuff, cold-process materials, and ladders, at heights and on hoisting equipment. (KC)

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ED219596

Roofing

Workbook and Tests

First-Aid Training

Prepared under the direction of the

CALIFORNIA EDUCATIONAL ADVISORY COMMITTEE FOR THE ROOFING INDUSTRY

and the

BUREAU OF PUBLICATIONS, CALIFORNIA STATE DEPARTMENT OF EDUCATION

5.25

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The following titles, each containing workbook and tests in a single volume, are also available in the Roofing series:

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Questions and comments about existing apprenticeship materials or the development of new materials should be directed to:

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A column labeled "Date Assigned" has been provided at the right-hand side of each page number in the contents. Whenever your instructor assigns a topic, he or she should write this date in the appropriate blank. When you have completed the topic satisfactorily, your instructor should place his or her initials next to the assignment date. If this procedure has been followed, and you should transfer from one school to another, you will have an accurate record of the work you have completed. It should never be necessary for you to duplicate work on topics already studied or to skip topics not previously assigned.

To provide other school records needed, be sure to fill in below your name, home address, and telephone number. Then ask your instructor to fill in the official date of your enrollment in his or her class and to sign his or her name.

NAME _____

ADDRESS _____

_____ PHONE _____

DATE ENROLLED _____

INSTRUCTOR(S) _____

_____

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Foreword

In the California apprenticeship programs, experience gained on the job is supplemented by classroom work that is closely related to the job. This balanced system of training enables the apprentice to learn the "why" as well as the "how" of the trade. Both types of training are required for advancement in today's competitive industries.

The job-related courses for the skilled trades are highly specialized, and adequate training materials are for the most part not available commercially. To meet this need, the Department of Education, in cooperation with labor and management, develops the required training materials and makes them available to you at cost. This workbook is an example. It was written to provide you with up-to-date information you must have to meet the growing technical demands of the roofing and waterproofing trade. Every effort has been made to make the workbook clear, comprehensive, and current.

I congratulate you on your choice of roofing and waterproofing as a career. The effort you put forth today to become a competent journey-level worker will bring you many rewards and satisfactions, and the benefits will extend also to your community. We need your skills and knowledge, and I wish you every success in your new venture.

Wilson Riles

Superintendent of Public Instruction

Preface

The State Department of Education, through the Bureau of Publications, provides for the development of instructional materials for apprentices under provisions of the California Apprentice Labor Standards Act. These materials are developed through the cooperative efforts of the Department of Education and employer-employee groups representing apprenticeable trades.

This edition of *First-Aid Training* was planned and prepared under the direction of the California Educational Advisory Committee for the Roofing Industry, with the cooperation of the State Joint Roofing Industries Apprenticeship Committee. The members of this committee include representatives of the Roofing Contractors Association of California and representatives of local unions. Employer representatives serving on the Educational Advisory Committee are Herman Littl- San Jose; Robert Culbertson, Sacramento; and Arthur Adams, San Carlos. Representing employees are Oscar Padilla, Los Angeles; Joe Guagliardo, Fresno; and William Penrose, San Jose. Special thanks and appreciation are extended to M. Duane Mongerson of Oakland, who served as Committee Adviser and to Richard J. McCowan, Buffalo, N.Y., and Joy Westberg, San Mateo, for their assistance in preparing the original manuscript. Bob Klingensmith, Publications Consultant, Apprenticeship, coordinated activities for the Bureau of Publications. Gratitude is also expressed to William R. Nesbitt, M.D., Chief, Disaster Medical Services Section, Department of Health Services, for reviewing the content of this publication for technical accuracy.

This publication is one of a series of nine individually bound units of instruction for roofing apprenticeship classes. These new books reflect the continuing cooperative effort of labor, management, local schools, and the Department of Education to provide the best instructional materials for California apprenticeship classes. They are dedicated to excellence in the training of roofing apprentices.

THEODORE R. SMITH
Editor in Chief
Bureau of Publications

First-Aid Training

TOPIC 1—INTRODUCTION TO FIRST-AID PRACTICES

This topic and the related instruction classes are designed to enable the apprentice to do the following:

- **List the most common types of on-the-job injuries sustained by roofers and waterproofers.**
- **Discuss the role of roofers and waterproofers in preventing injuries to themselves and to co-workers.**
- **Describe the steps that generally should be taken to protect a worker injured on the job from further exposure to danger.**
- **Establish priorities for caring for ill or injured workers at the jobsite.**
- **Develop a list of persons or agencies that can provide medical assistance for injured or ill persons at the jobsite.**
- **Evaluate transportation needs for workers with various types of medical emergencies.**

Burns, falls, and certain other types of injuries and accidents are occupational hazards for workers in the roofing and waterproofing industry. Roofing and waterproofing work is strenuous and involves prolonged standing, climbing, bending, and squatting. From the first day on the job, the apprentice should be constantly aware that the trade is a dangerous trade—one that requires unceasing attention to safety precautions in all aspects of the work.

Falls are the most common type of on-the-job accident in the roofing and waterproofing industry. Almost one-third of all roofing injuries involve workers' falling from ladders, through holes in the roof deck, off scaffolds, and even off the edge of the roof itself. Another 20 percent of all roofing-related accidents involve burns, especially from hotstuff or chemicals. Sprains, mostly to the back, account for another fifth of all roofing injuries. The majority of sprains result from improper lifting of awkward and heavy bundles during the various loading and unloading that the roofer commonly engages in. Other common injuries in the trade include abrasions, bruises, and the like that result when a worker is struck by a falling object; cuts from knives, saws, and hatchets; punctures from staple guns; and blows from hammers.

The best defense against accidents is an alert and knowledgeable worker. On-the-job accidents do not just happen. They are caused by careless roofers—roofers who rush around with buckets of hotstuff, who do not wear protective clothing and hard hats, or who think safety guards are a waste of time. Sometimes they are even caused by normally safety-conscious roofers who are hurrying to complete a job on schedule.

The safe roofer is one who obeys all safety rules at all times. The safe roofer is always alert, always on guard against unforeseen hazards.

But jobsite safety involves more than just working in a safe manner. Accidents and injuries do happen, and this fact alone makes it imperative that those in the trade be prepared to act quickly and efficiently to aid co-workers in need of simple medical assistance and to ensure that necessary professional care is provided as quickly as possible.

This workbook contains descriptions of all the first-aid practices roofers should know. If well learned and correctly applied, these basic principles will enable all roofers to handle most medical emergencies adequately. The workbook is not designed to serve as an in-depth course in first-aid procedures, however, since the assumption is made that skilled medical assistance will be available shortly after provision of initial first-aid care.

Whenever a medical emergency occurs, those present and able to provide assistance must act promptly to (1) evaluate the particular circumstances; and (2) determine a plan of action.

Evaluating the Circumstances

Protecting the injured party from additional harm and protecting other workers from similar injury is often critical. In the case of electrical shock, for example, shutting off the source of electricity may be essential for the safety of all those in the immediate area. If a heavy concentration of dangerous gases is present (carbon monoxide, ammonia, or chlorine, for instance), steps should be taken to minimize further exposure of the injured party and exposure of others. In addition,

the evaluation of the circumstances will be the basis for any decision pertaining to care to be provided to the ill or injured individual.

Formulating a Plan of Action

Once the situation has been evaluated and the possible cause and severity of the injury or illness have been determined, those at the scene can begin formulating a plan of action.

In subsequent topics of this workbook, specific steps to take for various types of injuries and illness are discussed in detail. The actions listed below are of a general nature and should be carried out as appropriate in determining a plan to care for, or secure care for, an injured or ill party:

1. Check for breathing.
2. If the victim appears not to be breathing, check for heartbeat.
3. Check for profuse bleeding.
4. Check for shock.
5. Check for burns.
6. Determine the victim's level of consciousness; that is, the degree to which the victim is alert and responsive to commands.
7. Check for neck or back injury.
8. Check for fractures.

Whatever the nature of the victim's illness or injury may be, nothing must be done that could cause further harm or damage, such as attempting to move an individual suspected of having a back or neck injury.

If more than one person is ill or injured, those at the scene must determine which of the parties is most in need of special care or assistance and act on the basis of such determined priorities.

It is recommended that to the degree possible roofers and waterproofers have with them at all times the names, telephone numbers, and addresses of agencies, organizations, and personnel in the local area that are qualified to provide medical care and related assistance. These include the fire department; police; physicians, clinics, and hospitals; California Highway Patrol; and ambulance services. Such information can be maintained readily in one's wallet or toolbox.

Fire departments are especially good sources of help when a medical emergency arises. Many fire departments include personnel who are trained to respond to calls for assistance for the sick or injured.

In developing a plan of action to aid a victim of injury or illness, one must consider also the need for transportation. Does the person need specialized transportation to prevent further injury—for example, injury to the neck or back? Can ordinary modes of transportation, such as a bus or automobile, be used to get the injured or ill person to medical care quickly and without doing further harm? If doubt exists, requesting specialized transportation is the wisest course of action.

Conditions that usually require ambulance transportation include the following:

- Injuries to the spine or neck
- Multiple injuries
- Major fractures
- Head injuries
- Serious burns

Summary

Good judgment and calm, logical thinking by those on the scene can be of the utmost importance to the ultimate well-being of a sick or injured person. As pointed out in this topic, this process involves these basic steps:

1. Evaluate the situation to ensure (1) no further exposure of the victim to the cause of the injury or illness; and (2) no exposure of self or others to the identified cause.
2. Determine the nature of the illness or injury and a plan of action to follow in administering aid or calling for assistance.
3. Identify appropriate resources, including specialized transportation if necessary, and summon them to the scene as quickly as possible.

Problems affecting breathing or heartbeat, excessive bleeding, and shock are extremely serious; and the possibility of such problems should be assessed first. Of the next greatest concern is the method to be used to transport the victim to a medical care facility or personnel.

FIRST-AID TRAINING

TOPIC 2—BURNS

This topic and the related instruction classes are designed to enable the apprentice to do the following:

- **Recognize the symptoms of first-, second-, and third-degree burns.**
- **Discuss the special factors that must be considered in treating burns.**
- **Explain why hot asphalt should not be removed from burned skin.**
- **Identify the actions that should be taken when a worker suffers any type of burn.**

"'Hot' behind you!" Apprentices who have not heard this familiar warning cry before, no doubt soon will. Roofers engrossed in their work do not like surprises, especially when the surprise is a splash of hotstuff from a bucket being carried by a fellow roofer.

Molten coal-tar pitch or asphalt is generally twice as hot as boiling water, and a spill or splash of either material will stick to the skin and burn the individual badly enough to leave a scar. (See Appendix A for tips on working safely with hotstuff.)

But burns from hotstuff are not the only kind of burns that roofers may incur on the job. Various solvents and other chemicals used in cold-process work, for example, can cause chemical burns. Electrical burns from contact with live electrical wires on the jobsite must also be guarded against.

The information provided in the remainder of this topic is designed to inform the apprentice about the proper procedures for treating the types of burns just described.

Classification of Burns

All burns are classified as either first-degree, second-degree, or third-degree burns, depending on the seriousness of the injury (see Fig. 2-1):

1. *First-degree burns* involve only the outer layer of skin and cause reddening, tenderness, and pain. The skin remains intact. Some degree of shock can result from first-degree burns.
2. *Second-degree burns* involve a partial loss or separation of the outer layers of the skin (blister formation). The outer layers of the skin are destroyed when blisters develop. Second-degree burns are more painful than first-degree burns and, if extensive, can result in shock.
3. *Third-degree burns* involve the entire thickness of the skin, and the skin may be charred or white. The charred areas are usually surrounded by areas of first- and second-degree burns. The area of skin sustaining the third-degree burn may not have any sensation. However, the skin surrounding the area of a third-degree burn will usually be extremely painful. Shock will develop rapidly if the third-degree burn is extensive.

Second- and third-degree burns are prone to infection, and great care should be taken to prevent contamination and infection. *All third-degree burns must receive medical attention as rapidly as possible.*

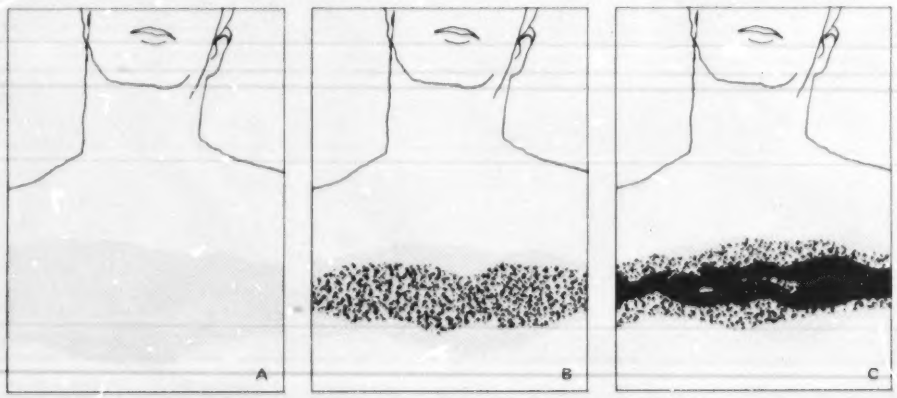

Fig. 2-1. Classifications of burns: (A) first-degree burn; (B) second-degree burn; (C) third-degree burn

Resinous and Thermoplastic Burns and First-Aid Measures

Resinous and thermoplastic materials are at very high temperatures when applied to roofs. Asphalt, for example, may range in temperature from 400° to 500° F. (204.4° to 260° C). Contact with such material is usually the result of splattering from kettles or spills or splashes from buckets.

The hands, arms, face, and neck are the parts of the body that most commonly receive resinous and thermoplastic burns. The particular area affected may vary from extensive portions down to a few blotches about the size of a dime. Because of the high specific heat and the sticky, plastic nature of these materials, the heat is retained and the burns are usually deep, third-degree burns, which are normally slow to heal and often leave unsightly scars.

In the event of a burn from a resinous or thermoplastic material, the following procedures are recommended:

1. Cool the burned area rapidly by immediately dipping the burned area in cool water or by flushing it with cool water. Continue this cooling procedure for at least 30 minutes. The primary object of this part of the treatment is to minimize third-degree burning by conducting the heat away from the hotstuff as rapidly as possible.

   Some burn victims may be reluctant to put a burned member of the body in water, probably because of the belief that water will cause blisters. These victims may want to wave the burned area in the air, which is of practically no benefit. The sticky masses of hotstuff retain the heat and burn deeper into the underlying tissues.

   Burned eyes should be flooded with water right away, and the victim should be taken to a doctor as soon as possible.

2. Treat the victim for shock. Help the victim to lie down, with the head level with the feet or the feet elevated slightly; and keep the victim warm with blankets or by some other suitable means. Assure the victim that medical help will be available soon. A stimulant may be administered. One-half teaspoon (2.5 millilitres) of aromatic spirits of ammonia in half a glass of water is the best stimulant, although warm coffee or tea taken in sips is also suitable. *NOTE:* Whiskey is not a stimulant and should not be given to someone in shock.

   All burns are accompanied by some degree of shock. In many cases subsequent treatment by a doctor is hampered or must be postponed because of shock. No matter how slight the shock may seem at first, it should be treated.

3. Call a doctor or other qualified person (a paramedic, for example) as soon as possible. This is best done by another person so that the victim is not left alone. In summoning professional help, be prepared to give explicit and complete information, covering the following points:

   - The location of the injured person
   - The nature, cause, and probable extent of the burn and the supplies available at the scene of the accident
   - The first-aid measures being taken

   Doctors are not mind readers; and often, in the excitement following an accident, essential information may be omitted or inaccurately transmitted. If the patient is to be taken to a hospital or other medical care facility, a telephone call to the facility is in order so that preparations can be made to receive the patient.

4. Apply a sterile dressing to the burned area, making sure to apply it loosely.

5. Do not remove the hotstuff if it is stuck to the skin. Absolutely nothing is to be gained by immediately attempting to remove the material, while waiting has definite advantages. Leaving the hotstuff on provides the most effective guard against both infection and shock, the two principal dangers of all burns.

   Asphalt at 300° F. (148.9° C) or higher is sterile and forms a good protective covering over the damaged tissue. Removing the asphalt exposes the whole area to the possibility of infection, and there is always danger of further damaging the underlying tissues by lifting pieces of the burned and weakened flesh with the adhering asphalt. The simplest and gentlest handling is vital. Even under the best of conditions, removing sticky, hard asphalt from a sensitive area is a slow and painful procedure.

   The sterile dressing recommended in step 4 above is intended to protect the burned area from accidental jostling or improper handling and should have a psychologically reassuring effect on the victim.

Some additional considerations in handling burns from hotstuff are the following:

1. Clothing should not be pulled off a burned area. If possible, the clothing should be cut free. This will prevent further damage to painful and damaged skin. Once the clothing has been cut free, the entire burn area should be covered with a

clean cloth that has been saturated with clean, cold water.

2. Burns are easily infected. The burn victim should be protected from coughs or sneezes on a burned area. The burned area should not be touched with unwashed hands or covered with a dirty cloth or dirty clothing.
3. Once the dressing is applied, it should not be removed. If the dressing begins to dry out, water should be poured over the entire burn area and allowed to soak through the dressing.
4. A victim with a moderate to severe burn who is going to see a physician within an hour should be given no food or water. The person may need to have an anesthetic, and his or her stomach should be empty when the anesthetic is given. If the burned area is small, or if the burn is of a minor nature, small sips of warm coffee or cool water may be given.

Chemical Burns

On cold-process roofing jobs, where an increasing number of new solvents and other substances are being used, roofers must be careful of skin contact with these substances. Many can cause chemical burns, even in a mist form. (See Appendix B for tips on working safely with cold-process materials.)

Immediate, profuse flushing of the skin with water or with any available bland solution should be done immediately. Alternates include milk and other cold beverages. Following irrigation of the area in contact with the chemical, the victim should be treated as discussed previously in the section on resinous and thermoplastic burns.

Electrical Burns

The danger of electrical burns is present on all construction sites. Loose and often live wires are frequently left lying where they can be stepped on or tripped over. Roofers carrying metal ladders have caused accidents resulting in electrical burns by touching the ladder to a live wire strung above them.

Victims of severe electrical burns may have a burn at not only the point of electrical contact but also the grounding point where the electrical energy is discharged from the body. For example, a person touching a wire with the back of the hand may receive a burn the size of a quarter on the hand but may have another burn of similar or greater size on the heel of one foot. Because of the extensive injury that the electricity causes in passing through the body, a person coming in contact with high voltage may lose consciousness, stop breathing, and have heart failure.

The first step in treating a victim of electrical shock is to make sure that the injured person is not still in contact with the source of electrical energy. The power should be shut off before anyone touches a victim still in contact with the source of the electricity. If disconnecting the power is impossible, efforts should be made to remove the injured person from the source of electricity with a dry stick or board. The stick or board should be wrapped with several thick layers of dry clothing or some other nonconductive material. A rubber mat, such as a floor mat from a vehicle, makes an excellent nonconductive padding. Care must be taken to prevent electrical current from passing through the injured person into the body of the individual attempting to provide aid. When the injured person is no longer in contact with the source of electrical energy, immediate resuscitative efforts should be started.

An electrical burn is treated as any other burn. A person exposed to severe electrical shock must have immediate medical attention.

FIRST-AID TRAINING

TOPIC 3—SKELETAL INJURIES

This topic and the related instruction classes are designed to enable the apprentice to do the following:

- **List the four major categories of injuries to muscles and bones.**
- **Describe the symptoms of cramps, pulled muscles, sprains, and fractures.**
- **Categorize the major types of fractures.**
- **Discuss the care of major muscle and bone injuries.**
- **Describe the general procedures that should be followed in caring for fractures.**
- **Demonstrate the use of splints for various types of fractures.**

Accidents are just waiting to happen to a careless roofer. A careless roofer may lift a load the wrong way and sprain the back or develop a hernia. A fall from a ladder could fracture an arm or leg. A slip on unsecured felt could result in a sprained wrist or twisted neck. Injuries such as these are fairly common in the roofing and waterproofing trade, partly because of the physical nature of the work. But they can be avoided by exercising caution and utilizing proper techniques in all phases of the work. (See appendixes C and D for tips on working safely at heights, on hoisting equipment, and with ladders.) When injuries do occur to muscles, joints, and bones, correct first aid can be instrumental in reducing pain and preventing further aggravation of the injury.

Cramps

Muscle cramps occur suddenly and can be extremely painful, especially when they occur in a large muscle. Such a cramp may be brought on by a blow to a muscle, or it may come after strenuous exertion. This is sometimes referred to as a "charley-horse."

An involuntary contraction, or spasm, of a muscle is sometimes associated with a knot that can be seen or felt.

Care for a muscle spasm or cramp includes gently massaging the knotted area, stretching the muscle by gently moving the affected part in the direction opposite from the side the cramp is on, and applying heat, especially moist heat (hot, wet towels) if available. If heat is used, great care must be taken not to burn the person.

Pulled Muscles, or Strains

A pulled muscle is one that has been overstretched or that has contracted with such force that some muscle fibers have torn. A pulled muscle can be very painful. When a muscle strain first occurs, a small amount of bleeding may be present in the muscle.

Indications of a pulled muscle, or strain, include localized pain, muscle spasm, and stiffness over a muscle that has just undergone strenuous exercise or that has been used in lifting.

Immediately after the occurrence of a pulled muscle, and for the first four hours following the onset of the injury, cold should be applied to the affected area. This will reduce bleeding into the muscle and reduce further irritation and spasm. After eight hours from the onset of the injury, the appropriate treatment is heat applied to the injured area.

Sprains

Sprains involve the stretching or tearing of ligaments—the tough, fibrous bands of tissue that hold joints together. The areas in which sprains most commonly occur are the knees, wrists, elbows, fingers, and other joints. A bad sprain can be as serious as a broken bone. Correct care given immediately after the injury can prevent much pain and shorten the period of disability.

Immediate pain and rapid swelling usually occur after a sprain. Sometimes discoloration appears early as a result of blood vessels being torn. Discoloration almost always occurs after several days.

The methods of care for sprains include immediate elevation of the sprained part above the level of the heart, with the person lying down and the injured part raised, and immediate and continued application of cold for two to three hours. A victim of a sprain should not bear weight on an injured joint in the lower extremity until a medical evaluation is made. In the upper extremity a sling should be used to help make the person more comfortable.

Fractures

Any break in a bone is called a fracture. Often fractures occur with severe sprains. With many fractures even a doctor cannot be sure that a bone has been broken until an X ray has been taken and studied. For this reason any severe injury that has applied great force to a bone should be considered as having caused

a fracture until a health professional determines otherwise. A person's ability to move an injured limb does not mean that a bone is not broken.

Kinds of Fractures

There are several kinds of fractures (see Fig. 3-1):

1. A break or crack in the bone, without displacement of the bone fragments (green stick).
2. A single break in which the bone is angulated or the ends separated (simple fracture).
3. Multiple breaks in the same bone (comminuted fracture).
4. A broken bone with a communicating wound to the skin (compound fracture). The end of the bone may protrude through the skin.

Signs and Symptoms of Fractures

The following are common signs that a person may have suffered a fracture:

- *Pain.* Pain may or may not be present immediately. Frequently after a fracture numbness occurs and may last 30 minutes or more.
- *Tenderness.* Pressure over the site of the break may produce pain.
- *Swelling.* Swelling may or may not be apparent. Immediately after a break there may be no swelling at all.
- *Deformity.* The bones may not be as straight as they should be, or the part may be twisted or shorter than normal. Running a finger along a bone that is near the surface is one way that an irregularity may be determined.

Examination of the Extremities

If the injured party is conscious, the person should be asked to try to move the arms and legs and to describe any pain. Care should be exercised in feeling any areas where pain is present.

With a fresh fracture numbness may be present, and if so, a great deal of pain may not be felt by the injured person. The arms and legs should be carefully examined if the person has been subjected to violent force. The bones of the arms and legs should be felt gently to determine whether there is any tenderness, swelling, or abnormal motion. If any of these conditions is present, the person should be treated as if having a fracture.

Examination of the Spine

An examination for injuries to the spine can be made by running the hand under the injured person (if the victim is lying on the back), along the full length of the spine. Any areas of swelling, tenderness, or deformity should be noted. If pain or any of these symptoms is present, the victim should be cared for as if the spine were injured. (See Topic 4, "Spinal Injuries.")

Methods of Caring for Fractures

In accidents involving fractures other injuries may be present, too. Assessments for other types of injuries should therefore be conducted as well:

1. If the victim is unconscious, check for breathing and heartbeat.
2. Check for bleeding. If bleeding is present, control it before proceeding with treatment of the fracture.
3. Treat for shock, since some degree of shock is present in all cases of fracture. Having a person

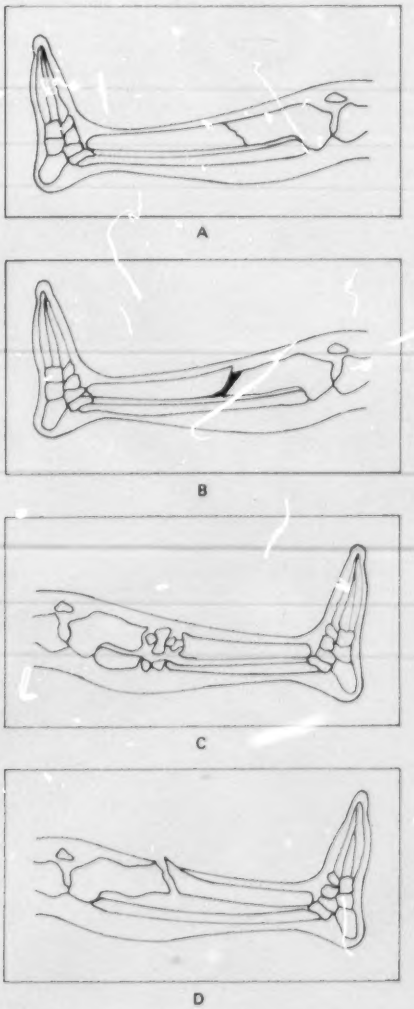

Fig. 3-1. Kinds of bone fractures: (A) green stick; (B) simple fracture; (C) comminuted fracture; (D) compound fracture

with a fracture lie down may prevent fainting, falling, and further injury.

Splinting of fractures. Ambulance attendants, law enforcement officers, and fire department personnel have had special training in the splinting of fractures. Splinting of fractured bones should be left to one of them if they are immediately available.

Fractures should be splinted before the injured person is moved. The only exception to this rule is when the victim's life is in extreme danger, such as in a fire.

Ankle or wrist fracture. Fractures that are not more than 1 inch (2.5 centimetres) above the wrist or ankle may be splinted with a splint that runs from the fingers to the elbow or from the foot to the knee (see Fig. 3-2).

Fig. 3-2. Splinting ankle and wrist fractures

Leg and forearm fractures. Splinting fractures below the elbow or knee can be done with a piece of any rigid material that will extend from the tip of the fingers to the armpit or from the toes to the groin. The material should be padded, if possible, with clothing, towels, or some other cloth. Then the material should be snuggly secured by ties, but care should be taken to prevent putting a tie over the fracture site (see Fig. 3-3).

Thigh fractures. Fractures of the thigh can be splinted best with a traction splint; but in the absence of someone skilled in applying a traction splint, the victim's whole body should be immobilized on a rigid stretcher, a piece of plywood, a door, or some similar material with a rigid, flat surface. Such a procedure will provide adequate immobilization of the fracture. If a flat, rigid material is not available for immobilizing the body, two padded boards can be used to splint the leg: one on the inside of the leg, extending from the foot to the groin; and one on the outside of the leg, extending from the foot to the armpit. These boards should be well padded and tied securely in place.

Upper arm fractures. When the upper arm is fractured, the arm may be bound to the chest and immobilized (see Fig. 3-4).

Collarbone fractures. Splinting of fractures of the collarbone may be done in a manner similar to splinting of the upper arm (see Fig. 3-4).

Elbow and knee fractures. Fractured elbows and knees should be splinted in the position in which they are found after the accident. No attempt should be made to straighten or move fractured elbows or knees, because doing so could aggravate such injuries.

Hip fractures. When an elderly person falls, it should be assumed that the hip has been fractured until an X ray proves otherwise. A fractured hip can be splinted by using a method similar to that used for a fractured thigh (see Fig. 3-5).

Open, or compound, fractures. Open, or compound, fractures should be splinted as they are found after the injury if possible. If a fractured bone is protruding through the skin, it should be covered with a clean dressing, held in place with a bandage, and then splinted (see Fig. 3-6).

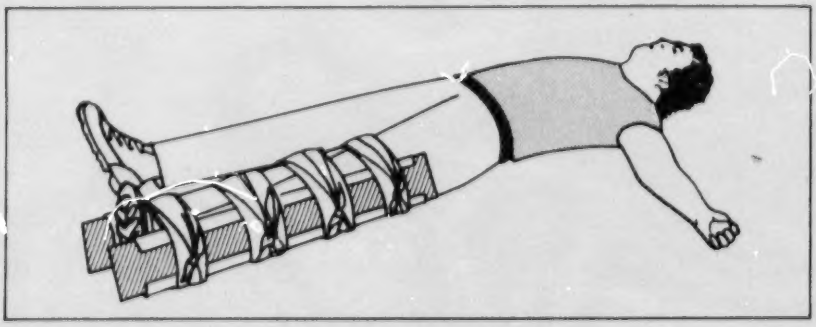

Fig. 3-3. Leg splint

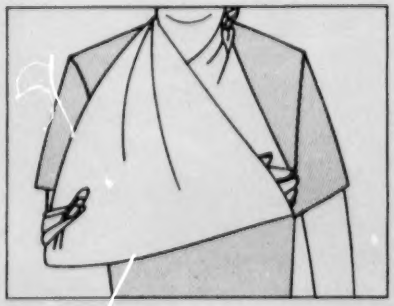

Fig. 3-4. Upper arm and collarbone splint

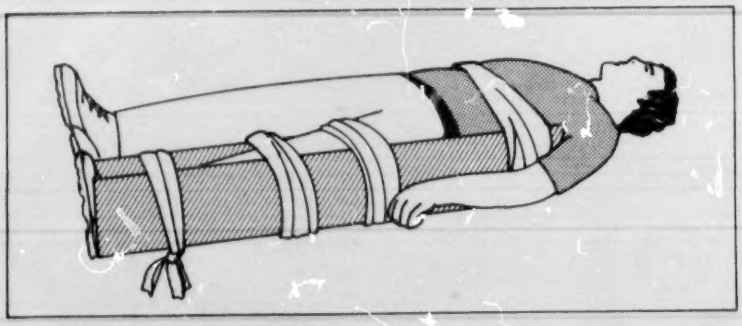

Fig. 3-5. Splinting thigh and hip fractures

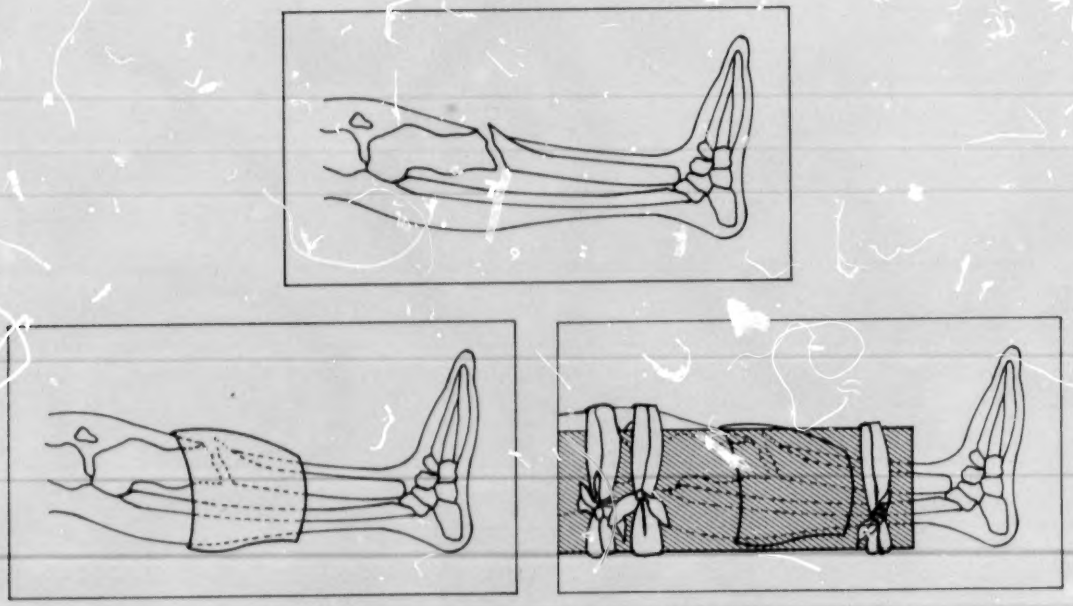

Fig. 3-6. Splinting open, or compound, fractures

FIRST-AID TRAINING

TOPIC 4—SPINAL IN. URIES

This topic and the related instruction classes are designed to enable the apprentice to do the following:

- **Follow appropriate procedures in examining a person who may have a neck injury.**
- **List the symptoms of injury to the spinal cord.**
- **Discuss the method of caring for persons with spinal injuries.**
- **Demonstrate how to splint an injured neck properly.**
- **Describe how a person with a back or spinal cord injury should be moved.**

Falls are a common occupational hazard in the roofing and waterproofing industry. Many roofers have been seriously injured as a result of falls off roofs, off ladders, through unmarked or unguarded openings in the roof, and from hoists and scaffolds. Of the injuries that can be sustained from a fall, the most serious involve damage to the spine, or backbone. And like most other injuries that roofers sustain, the majority of spinal injuries occur when the roofer becomes careless and ignores proper safety procedures.

The seriousness of a spinal injury is readily understandable. All movements of the body and many of the functions of the vital organs are controlled by nerves running from the brain through the spinal cord to the various parts of the body. The spinal cord runs through a narrow bony canal in the backbone (spine). When the spine is dislocated or broken, the canal through which the spinal cord passes is disrupted, and the spinal cord may be severed or so severely compressed that the nerves cease to function, resulting in paralysis. The part of the spine in the neck (cervical spine) is particularly important, because the cervical spine is not as strong or as well protected as the rest of the spine. Because of its location near the brain, injury to the cervical spine will affect all functions that the spinal cord performs below the level of the injury. A break high on the cervical spine can affect breathing, and this is one reason people die from a broken neck.

Incorrect care of a person with this kind of injury can cause death. Immediate, correct care, on the other hand, may not only save the person's life but also prevent the injured party from becoming permanently paralyzed. Even if no signs or symptoms of spinal injury are present, a neck injury should be suspected if an injured person is unconscious from an unknown cause, has been subjected to violent force in an accident, or has injuries to the face or head.

After the victim's level of consciousness has been determined, the bones in the back of the person's neck should be gently felt for irregularities or pain. If conscious, the injured person should be asked to move the arms and legs to determine whether there is paralysis. Also, the arms and legs should be examined to see whether feeling is present. If the patient has numbness or loss of feeling in either arms or legs, pain in the back of the neck, or any irregularity of the neck bones, extreme care should be taken in any further evaluation or treatment. Even if a person does not show any signs of neck or spinal injury, if the person has been subjected to violent forces, he or she should be treated as if there were a neck injury. Such forces could include an automobile accident, a bad fall, and so forth. Unconsciousness or injuries to the face, the head, or the neck should be taken as an indication of injury resulting from some violent force.

Symptoms of Injury to the Spinal Cord

The symptoms of injury to the spinal cord are the following:

1. Numbness and tingling of the arms, legs, fingers, or toes
2. Paralysis or inability to move any one, or all, of the extremities
3. Pain in the region of the injury
4. Loss or decrease of sensation of pain below the location of the injury

Method of Caring for Persons with Spinal Injuries

The following procedures must be observed very carefully in caring for spinal injury victims to prevent further injury and possibly even death:

1. Do not move the victim until trained medical help arrives unless the injured person's life is in danger, such as from fire, drowning, or traffic hazard.
2. Make a splint for the neck if it is absolutely essential to move a person with a neck injury.

The neck can be splinted by taking a suit coat, medium weight jacket, heavy shirt, or heavy bath towel and rolling it into a cylindrical shape. If a jacket or coat is used, the pockets must be emptied. Then, while one person exerts gentle traction on the neck, keeping the head motionless and in direct alignment with the spine, another person carefully and gently slips the rolled-up coat or jacket behind the injured person's neck and brings the ends together under the chin, holding the material in place by means of a belt, string, or tape (see Fig. 4-1).

Make sure that the injured person's breathing is not interefered with. While someone continues to exert slight traction on the injured person's neck, holding the head motionless and in direct line with the body, the injured person can be moved. If a wide board is available, the board should be slipped behind the person and extended from the lower back to the top of the head. The head and body can then be secured to the board by means of tape. Caution must be taken to ensure that the head is not moved in the process.

3. Make a splint for the spine if a person with a back injury must be moved. However, a person with a back injury—and with a suspected spinal cord injury—should not be moved until professional help is available unless the individual's life is in immediate danger.

Fig. 4-1. Splinting the neck

In cases where a person with a back or spinal cord injury must be moved, a piece of plywood or a board at least as wide as the injured person's shoulders and hips should be used as a splint. The board should be as long as the injured person, and the injured person should be secured to the splint to prevent his or her sliding or falling off. Tape, bandages, or belts joined together can be used for this purpose (see Fig. 4-2).

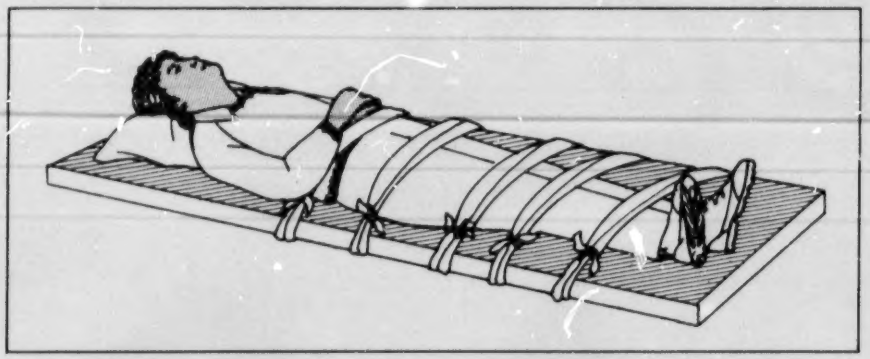

Fig. 4-2. A spine splint for back injury

FIRST-AID TRAINING

TOPIC 5—WOUNDS, BLEEDING, AND BRUISES

This topic and the related instruction classes are designed to enable the apprentice to do the following:

- **Define the term *wound*.**
- **List the symptoms of various types of wounds, including punctures, cuts, lacerations and abrasions.**
- **Identify the actions that should be taken in treating the various types of wounds.**
- **List the actions that should be taken in bleeding cases.**
- **List the major principles involved in applying tourniquets.**
- **Demonstrate proper bandaging techniques for major types of wounds.**
- **Describe how bruises are caused.**
- **Describe how to determine whether a person's blood circulation is good or bad.**

Some roofers have had to suffer the pain of a cut from sheet metal or a nail puncture before they realized the value of obeying safety rules. Others have learned the hard way that spreading mastic with bare hands is a dangerous practice. Even the careful roofer, however, is subject to cuts, lacerations, punctures, abrasions, and bruises on the job, because there is no guarantee that co-workers will always work in a careful manner.

The term *wound* is used to describe all injuries that involve penetration, cutting, or other damage to the skin.

Puncture Wounds

Puncture wounds may be caused by such items as nails, pins, staples, trowels, screws, and knives. When a puncture wound occurs, dirt and other foreign materials that contain bacteria may be carried under the skin, where they can cause infection. In the case of puncture wounds, it is sometimes hard to judge how much damage has occurred under the skin. Even in small puncture wounds, enough bacteria to cause lockjaw and other serious infections may be present.

Victims of puncture wounds should always see a doctor for a tetanus shot if they have not had such a shot recently.

Cuts and Lacerations

Lacerations and cuts may be clean or dirty, large or small. Cleansing such wounds and evaluating the need for stitches can best be done by a physician or a nurse. Until the victim is able to receive professional medical attention, however, a clean dressing should be applied to the wound. If bleeding is profuse (abundant), a pressure dressing should be applied.

Abrasions

Abrasions occur when the top layers of the skin are scraped away, as with skinned elbows and skinned knees. Often dirt and gravel are embedded in the skin when abrasions occur. If this foreign matter is not removed, infection and possible permanent discoloration of the skin may result. If the abrasion is minor, gentle washing with clean, warm water and a bland soap may be all that is necessary to remove the dirt. The abrasion should then be covered with a clean, dry dressing. Abrasions that are dirty or deep or that involve a large area of skin should be examined by a health professional.

Bleeding

Bleeding may occur in any of several forms: (1) oozing from very small vessels; (2) bleeding from veins (dark color and steady flow); and (3) bleeding from arteries (bright red, may spurt). Bleeding from arteries requires more pressure to stop than bleeding from veins. Bleeding of any type requires immediate attention. Excessive loss of blood can cause shock and eventual death if the bleeding is not controlled.

Actions Necessary in Bleeding Cases

The following actions must be taken to prevent excessive blood loss of injured persons:

1. Elevate the bleeding part above the level of the heart if possible. Elevation of the injured part may be enough to stop bleeding from veins; but unless a pressure dressing is applied to the wound, bleeding may start all over again when the bleeding part is lowered.
2. Apply direct, firm, even pressure over the wound with a dressing or clean cloth (see Fig. 5-1). If no

dressing or clean cloth is available, use your hand.

3. Apply a bandage or clean cloth firmly over the dressing to maintain pressure (see Fig. 5-2).
4. If blood soaks through the bandage or cloth, apply more dressings and bandages over the old ones.

Use of Tourniquets

The use of a tourniquet may be necessary to control excessive bleeding that threatens life (see Fig. 5-3):

1. A tourniquet must not be used unless severe, life-threatening bleeding cannot be stopped in any other way.
2. Tourniquets can be used only on arms and legs and must be applied between the wound and the body.
3. Tourniquets should be approximately 3 inches (7.6 centimetres) wide. A triangular bandage that is folded into a 3-inch (7.6-centimetre) width, wrapped twice around the extremity, and then twisted with a stick makes a satisfactory tourniquet. *Tighten only enough to stop the bleeding.*
4. Once applied, a tourniquet should not be loosened until the injured person obtains medical aid. The injured person should be transported at once to a doctor.

Fig. 5-1. Applying pressure to a laceration to control bleeding

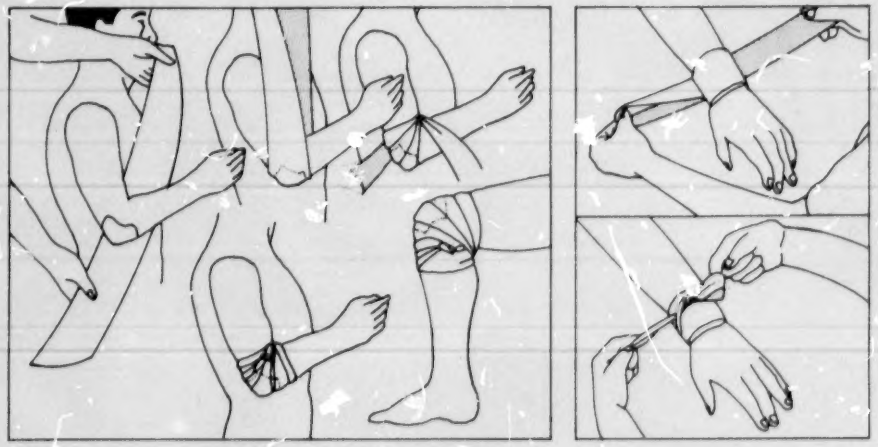

Fig. 5-2. Applying bandages to wounds to maintain pressure and keep wounds clean

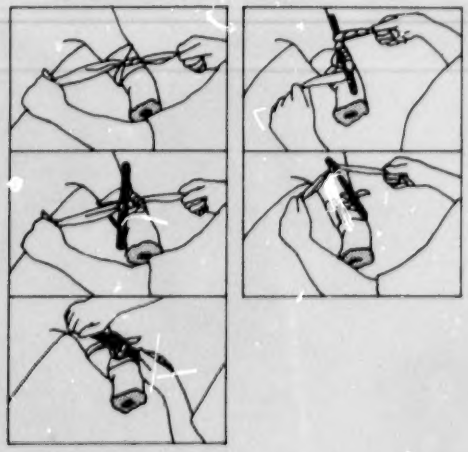

Fig. 5-3. Applying a tourniquet to stop excessive bleeding

Bruises

Bruises are caused by an external force that breaks blood vessels in and under the skin, resulting in "black and blue" marks.

The elevation of the bruised part, if practical, and the application of something cold for 30 minutes will reduce the size of the bruise. Application of cold is especially valuable with large or severe bruises.

Circulation System and Nerve Damage

The ends of the fingers and toes should be checked for feeling and for evidence of good circulation. If circulation is absent or is poor, the fingers or toes of the affected extremity may be white-purple (cyanotic) or numb. *NOTE:* Numbness could be the result of a bandage that is too tight, an injured nerve or blood vessel, or some similar circumstance.

FIRST-AID TRAINING

TOPIC 6—EMERGENCIES OF THE HEART AND BLOOD CIRCULATION SYSTEM

This topic and the related instruction classes are designed to enable the apprentice to do the following:

- **List the symptoms of a heart attack.**
- **Describe the actions that should be taken for each major symptom of a heart attack.**
- **Describe the best method to use to determine whether a person's heart is beating.**
- **Discuss the symptoms of pulse abnormalities.**
- **Describe the actions that should be taken for each symptom of pulse abnormality.**
- **List the major symptoms that indicate that circulation problems may be present in veins and arteries.**
- **Recognize the symptoms of shock caused by loss of blood.**
- **Discuss the actions that should be taken to treat a person for shock caused by loss of blood.**

Although heart attacks and other heart problems are not necessarily common among roofers and waterproofers, they can occur anywhere and at any time. When a heart-related problem does occur, immediate, proper assistance is essential.

Emergencies of the heart and circulation system include heart attack, lack of heart beat, heart failure, pulse abnormalities, heart palpitation, circulation problems, and shock.

Heart Attacks

Heart attacks seldom occur in individuals before the age of twenty years. The frequency of heart attacks among the general population increases with age.

The symptoms of a heart attack include the following:

1. The victim may have tight or crushing pain in the chest, frequently radiating to the arms, shoulders, back, neck, or jaw.
2. Pain may come in waves or may remain constant.
3. The victim may become nauseated, weak, and short of breath and may also perspire.

Emergency measures for the victim of a heart attack are the following:

1. Anyone experiencing the symptoms of a heart attack should have immediate medical care. The heart can suddenly stop beating. In this event heart compression or cardiopulmonary resuscitation (CPR)* should be started by a trained person.
2. If breathing stops, give rescue breathing.
3. Call for medical help.

*Adequate instruction in CPR is beyond the scope of this workbook, but it is strongly recommended that every roofer get this training. The training requires four hours and is provided by local hospitals, fire departments, heart associations, and other organizations.

Absence of a Heart Beat

The best method to use to determine whether a person's heart is beating is to feel for the pulse just beside the windpipe. On each side of the windpipe is a large artery called the carotid artery. Generally a pulse can be felt here when it cannot be felt at any other location in the body. To check the pulse at this location, a person should place three fingers on the victim's neck, next to the windpipe, and press gently backwards (see Fig. 6-1). The carotid artery should be felt pulsating on the side of the Adam's apple as the fingers are pressed gently toward the back of the neck. If the heart is not beating, cardiac compression should be started at once.

Heart Failure

The symptoms of heart failure include the following:

1. The victim may be short of breath.
2. The victim may be coughing up froth, which may be pink.
3. Marked swelling of the ankles may be present.

If an individual is exhibiting any of these symptoms, the person should be taken to a physician as quickly as possible. In the meantime a person experiencing shortness of breath should be placed in whatever position allows the greatest comfort in breathing. Usually this is the sitting position.

Pulse Abnormalities

Pulse abnormalities include rapid pulse and weak pulse.

A very rapid pulse (called paroxysmal tachycardia) is usually not dangerous, but it does create anxiety in the victim and should be evaluated immediately by a doctor. The person should be kept quiet until such

Fig. 6-1. Checking the carotid artery for sign of a pulse

examination. A rapid pulse is generally one that exceeds 170 beats per minute.

Strenuous exercise, fright, or apprehension may cause the heart to beat rapidly, but usually the heart rate begins to slow a few minutes after the cause is over. With rapid pulse the heart can continue to beat fast for an indefinite period. The rapid pulse may spontaneously slow as quickly as it started, or it may continue until medical treatment is given.

For either a weak pulse or an irregular pulse, the person should be checked as soon as possible by a doctor.

Circulation

Circulation problems resulting from illness or injury include damage to the veins and arteries.

Injuries to Veins

Certain types of injuries may result in damage to blood vessels. Appropriate and immediate care for such injuries can shorten recovery time considerably. The most common sites of blood vessel injury are the fingers, hands, and forearms. However, with a person who has varicose veins, the site is usually the legs.

Vein injuries are characterized by rapid development of bluish lumps under the skin.

Treatment consists of immediate elevation of the injured part, application of cold to the injured area, and application of a snug compression bandage, preferably elastic.

Injuries to Arteries

Injuries to arteries may be caused by a direct blow, resulting in severe spasm or blood clot formation; or they may be caused by a fracture when a broken end of a bone damages an artery. When arteries are injured so that the blood flow to an area of the body is stopped, the tissue supplied blood by those arteries is likely to start to die.

Coldness in the injured area; white, gray, or bluish tissue; and numbness in the flesh are all signs of possible injury to arteries.

If a person is believed to have suffered arterial damage, the injured part should be kept level or raised slightly. Neither heat nor cold should be applied, and the injured party should be prevented from using the injured part. The person should receive professional medical care as soon as possible.

Shock

Shock occurs when something happens that reduces the flow of blood to the brain and to other vital organs. Shock can cause death if not treated promptly. Shock can occur even though no injury is evident. All persons with serious injuries should be treated for shock regardless of whether or not they show signs and symptoms of shock.

Shock is characterized by a weak, rapid, or undetectable pulse; cool, moist skin; and skin that is pale white to grayish blue in color.

In treatment for shock the victim should be kept lying down flat. Blankets, clothing, or other items should be used to keep the victim warm. Care should be taken to place such items underneath the victim as well as on top (see Fig. 6-2), because body heat can be lost more quickly into the ground than into the air. For every layer of protection placed over the person, two layers should be placed underneath. No food or drink should be given to a shock victim.

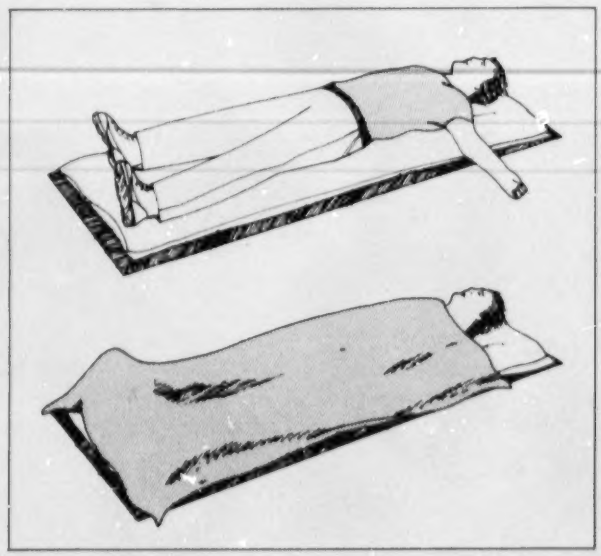

Fig. 6-2. Protecting a shock victim against loss of body heat

TOPIC 7—BREATHING AND AIRWAY MAINTENANCE

This topic and the related instruction classes are designed to enable the apprentice to do the following:

- **Identify the four major reasons that breathing may stop or be seriously impaired.**
- **Decide which first-aid techniques should be used in aiding a victim whose breathing has stopped or is impaired.**
- **Define the term *choking*.**
- **Recognize the various situations in which choking is likely to occur.**
- **Describe the actions that should be taken in each of the major situations in which choking may occur.**
- **Describe how the Heimlich maneuver is performed when a choking victim is in a prone position or in a standing position.**
- **List the steps involved in rescue breathing.**
- **Describe emergency treatment procedures for victims of sucking chest wounds.**
- **Define *hyperventilation*.**
- **Describe the actions to take with someone who is hyperventilating.**
- **Describe what should be done for a person experiencing chest pains.**

Stoppage of breathing or serious impairment of the breathing process can result in brain damage. This type of emergency can be brought on by any of several causes, including severe electrical shock (such as may occur from a worker's striking a metal ladder against a live electrical wire); a head injury (from a fall from a roof or ladder, for example); a severe blow to the chest (such as may occur from a fall or from being struck by materials or equipment that is being moved); or inhalation of noxious fumes. Any disruption of the breathing process requires immediate medical care.

Breathing may stop or be seriously impaired for the following reasons:

1. Obstructions may prevent air from moving in and out of the lungs. This can be caused by the tongue falling back in the mouth; by blood or mucus in the respiratory tract; or by some foreign body, such as a piece of meat or candy, becoming lodged in the windpipe.
2. The brain centers controlling breathing may stop functioning because of poisoning, drowning, severe electrical shock, or head injury.
3. Breathing may stop because the bellows action of the chest has been interfered with in some mechanical way. This interference may be caused by compression of the chest through accidents, such as a cave-in, where dirt, sand, or other material prevents chest movements. It may be caused by fracture of the ribs along each side of the chest, making the muscles that move the chest up and down ineffective. It may also be caused by an open wound that penetrates the chest, causing what is called a *sucking wound* of the chest. This kind of wound prevents the lungs from expanding when the chest cavity is expanded.

   Another factor that prevents the lungs from expanding is the entrapment of air between the chest wall and the lung. This is usually caused by air leaking from the lung into the chest cavity. If a substantial amount of air leaks from the lung into the chest cavity, the lung may collapse completely. If air pressure builds up in the chest cavity and pushes the heart to the other side, the person could die. Prompt medical attention is of the utmost importance in such cases.

A person deprived of oxygen needs medical help as rapidly as possible. Most people can do without oxygen for up to four minutes without sustaining serious injury. After four minutes brain damage is likely to occur. Therefore, an attempt to restore respiration should always be made, since one cannot be sure whether or not irreversible damage has occurred. Under some circumstances, however, a person can survive for longer periods of time without serious injury to the brain.

Choking

Anything stuck in the throat and blocking the air passage may prevent breathing and cause unconsciousness or death within a few minutes.

A choking victim who can speak, cough, or breathe does not need assistance. The person should try to solve the problem without help. If breathing stops, however, and the person cannot speak, cough, or

breathe, the antichoke maneuver (Heimlich maneuver) described below must be performed.

A choking victim may be gasping for breath, and the skin may turn dusky blue. The victim may also lose consciousness.

The Heimlich manuever is performed in the following manner (see Fig. 7-1):

1. Grasp the victim from behind, with hands clasped halfway between the navel and the breastbone.
2. Give a quick squeeze inward and upward under the rib cage.
3. If not successful the first time, repeat the procedure several times.
4. If the choking person is unconscious or lying down, place your hands over the victim's stomach, halfway between the navel and the breastbone, and push sharply inward and upward.

With choking victims air is usually trapped in the lungs. A quick compression of the chest will frequently pop the obstruction out of the person's throat like a cork being blown out of a bottle. The maneuver may be repeated several times. If the maneuver is still unsuccessful, two fingers should be inserted into the victim's mouth to determine whether a foreign object can be retrieved. Great care should be taken not to push the foreign object farther down the throat. If the victim falls to the ground during a choking attack, the victim should be turned on the back, and with the hands close together in the area halfway between the navel and the breastbone, the person administering first aid should give a vigorous inward and upward push, thus compressing the air in the lungs and attempting to pop out the object obstructing the airway.

Fig. 7-1. Applying the Heimlich maneuver in prone and standing positions

Actions for Breathing Emergencies

When a person is found unconscious and does not appear to be breathing, certain steps should be taken immediately. First, the situation in which the person is found should be evaluated to ensure that the cause for the lack of breathing does not still exist. A check must be made to ensure that the person is not in contact with an electrical wire or other device that might have caused electrical shock. If this is the case, the electricity should be turned off, or the person should be removed from the electrical source by using a dry stick, as previously described.

If the person did not suffer an electrical shock, a determination should be made as to whether some poisonous or dangerous gas has caused the person to stop breathing and is still present. If this is the case, the person should be dragged quickly into an open fresh air space before rescue breathing is started. An attempt should be made to awaken the person by shaking and shouting. The person should be asked whether he or she is all right. If there is any response, such as a moan or a sigh, the person is probably breathing. If no response is noticed, signs of breathing should be checked for. The victim should be lying on the back. If it is necessary to roll the victim over, the entire body should be moved at one time. Clothing around the neck or chest should be loosened, and the airway should be checked for obstruction.

If the victim is unconscious, it may be difficult to tell whether or not the victim is breathing, especially if the person is wearing heavy clothing. Determining whether or not the person is breathing can be done as follows:

1. Gently lift the victim's neck with one hand while pushing back on the forehead with the other hand, thus tilting the head backwards. This head position keeps the tongue from blocking the throat (see Fig. 7-2).
2. Check for visible chest movements. Does the chest move up and down with respiration?
3. If no chest movements are seen and if breathing cannot be heard, there is still a possibility that the person is breathing. Place a small wisp of cotton or a strip of single-layer tissue paper directly over the opening of the nose or the open mouth. Any visible movement of the cotton or

tissue paper as the air is inhaled or exhaled would indicate that the victim is breathing (see Fig. 7-3).

4. On a cold day, if a mirror or a piece of glass is placed near the opening of the nose or the open mouth, the cold glass, metal frame, or mirror will fog. A pair of eyeglasses also makes a satisfactory object for this test. However, whatever object is used must be much colder than body temperature, or the fogging (condensation of moisture) will not take place. If breathing is not present, proceed with mouth-to-mouth resuscitation, as described in this section.
5. If you think the person is not breathing or if there is any question as to whether or not the person is breathing, assume that the person is not, and give rescue breathing immediately. Do not waste time performing the above mentioned tests.
6. Have someone else summon professional help.

Rescue Breathing

Rescue breathing steps must be performed in the following manner and order:

1. Clear the airway. Hold the victim's head in the tilted-back position, and insert two fingers into the person's mouth. Search for any foreign objects or for the presence of dirt or secretions.

   If dirt, secretions, or particles of material are present, they may be obstructing the person's airway. Try to sweep them out with the fingers; or wrap a handkerchief around the fingers, and repeat the maneuver, getting as much of the material out as possible. Sometimes turning the person's head to one side will facilitate this process.

   If an object cannot be removed with the fingers, proceed with the procedure for choking (Heimlich maneuver).

2. If the airway is clear, start mouth-to-mouth rescue breathing (see Fig. 7-4). With one hand on the victim's forehead and the victim's head tilted back, pinch the victim's nose shut with the fingers, take a deep breath, and place your open mouth over the victim's open mouth. (Maintaining the victim's head in a tilted back position helps to keep the airway open.) Blow the air into the victim's mouth, observing to see whether the chest rises. Quickly repeat this four times. After the fourth breath feel the victim's neck, as described earlier, to see whether a pulse is present. If no pulse can be felt, a trained person should start cardiac compression. Continue with the rescue breathing, giving one breath every five seconds, or 12 times a minute. When removing your mouth from the victim's mouth, turn your head to the side and listen for escaping air or observe whether the chest falls. If either one of these things is observed, the rescue breathing is working. Continue this effort until help arrives.
3. Mouth-to-mouth rescue breathing can also be performed on an infant or small child. With an infant the procedure is essentially the same, except the mouth is used to cover both the infant's nose and mouth. However, *small* puffs of air are blown into the infant. Large breaths

Fig. 7-2. Opening the airway by tilting the head

Fig. 7-3. Checking for signs of breathing

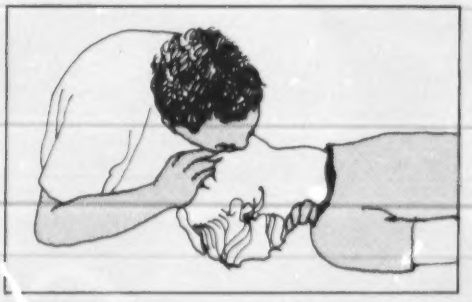

Fig. 7-4. Mouth-to-mouth rescue breathing

under force could rupture the infant's lungs. The breathing of an infant is more rapid and should be at the rate of about 20 breaths per minute, or one every three seconds.

Rescue breathing may be needed for a long period of time. If one rescuer gets tired, he or she can alternate with another person.

The first sign of restored breathing may be a sigh or a gasp. Breathing may be irregular at first, and rescue breathing should be continued until the victim's breathing is spontaneous and fairly regular. When normal breathing resumes, the victim usually recovers rapidly. However, the victim should be observed carefully, and the rescuer should be prepared to start rescue breathing again if the injured person stops breathing.

Sucking Chest Wounds

In some cases of violent injury to the chest, a hole is made that permits air to flow in and out of the chest cavity when respirations occur. When this happens, the lungs cannot correctly fill with air, and the victim may have serious breathing difficulties. The treatment for this is to cover the hole at the time the victim has breathed out. The hole can be covered with the hand; with a piece of plastic, such as a sandwich bag; or with some other material through which air will not pass (see Fig. 7-5). This hole should be kept covered to prevent air from leaking into the chest cavity. Medical treatment should be obtained as quickly as possible.

Asthma Attacks

Asthma attacks can come on quickly and can be quite severe. In a typical asthma attack, the person seems to be able to inhale, but is unable to exhale air from the chest. With air trapped in the lungs, the victim is unable to breathe in and out effectively. This can be frightening to both the victim and the individual providing emergency care. Anxiety aggravates the problem.

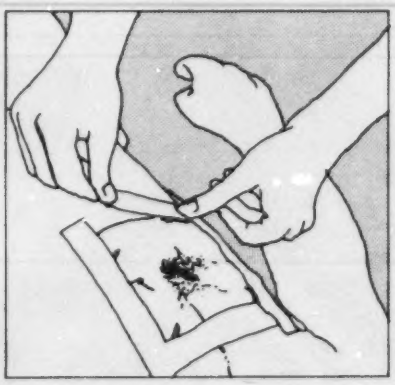

Fig. 7-5. Applying a covering for a sucking-type chest wound

The victim should be seated in the most comfortable position possible and transported to a doctor or medical facility as quickly as possible. If the person has a nebulizer, atomizer, or medication, assistance in using it should be provided.

Allergic Reactions

Some allergic reactions cause swelling of the lip, tongue, and throat. Allergic reactions can be extremely serious and can result in loss of life if swift action is not taken. A person developing such swelling should be given medical care immediately. Bee stings sometimes cause an allergic condition. People who know they are subject to an allergic reaction sometimes carry a syringe of medicine for such an emergency. If the person has a syringe and is subject to allergic attacks, assistance should be provided in administering the medication.

Hyperventilation

People who are inclined to have emotional problems that affect breathing also may suffer hyperventilation (overbreathing). Because they feel they cannot get enough air, they breathe too much air, or hyperventilate. This hyperventilation changes body chemistry and may cause cramps or spasms in the hands and feet. It may also be accompanied by feelings of numbness around the mouth and face and a feeling of great anxiety.

The most appropriate action to take in hyperventilation cases is to reassure the victim and have the victim hold his or her breath. If the person has been observed breathing rapidly and has developed stiffness and spasms of the muscles of the hands, having the person breathe for two minutes into a paper bag will relieve this condition.

Chest Pain

Chest pains can affect breathing. Anyone whose breathing is affected by such pains should be examined by a physician. Pains in the chest that affect breathing may be caused by a number of conditions: collapsed lungs, fractured ribs, irritated nerves, muscle spasms, blood clots in the lung, heart trouble, or infection. Only a physician can differentiate between these various conditions and give the proper treatment. Any person having pain in the chest that affects breathing should be examined as soon as possible by a physician.

TOPIC 8—HEAD INJURIES, UNCONSCIOUSNESS, FAINTING, AND CONVULSIONS

This topic and the related instruction classes are designed to enable the apprentice to do the following:

- **List the major questions that should be answered if a person has suffered a head injury.**
- **Describe the actions that should be taken with a victim of a head injury.**
- **Determine whether a head injury is serious enough to require professional medical treatment.**
- **List the "mechanical causes" of unconsciousness.**
- **Explain the procedure that should be followed in rendering first aid to unconscious persons.**
- **List the causes and symptoms of fainting.**
- **Describe the procedures to be followed with a person who is dizzy or light-headed or who has buzzing in the ears.**
- **Specify the major causes of convulsion.**

In the roofing and waterproofing industry, head injuries are generally the result of falls from roofs or ladders or of a worker's being struck by falling debris, equipment, or the like. Injuries to the head are diffiult to evaluate, even for a physician; and certain basic principles must therefore be followed. Observing these principles can help the physician with his or her assessment of the injured person later on.

Principles to Be Followed with Head Injuries

In the event that a person suffers a head injury, answers to the following questions should be sought:

1. How did the accident happen?
2. How great and what kind of force was involved? What was the distance of fall or the size and speed of the object that hit the head?
3. Did the injured party lose consciousness? Was the injured person dazed? If so, for how long?
4. Did the victim lose consciousness initially, regain consciousness, and then lose consciousness again.
5. Did the injured person vomit or bleed from the nose or ears?
6. Are the pupils of the eyes equal in size, or have they changed size?
7. Did the injured party have a convulsion or become rigid or stiff?

Actions to Be Taken with Head Injuries

The following actions must be taken in the case of a head injury to prevent further injury and to get adequate medical care as soon as possible:

1. Check and maintain breathing by making sure the person has a clear airway. (See Topic 7, "Breathing and Airway Maintenance.")
2. Control bleeding. (See Topic 5, "Wounds, Bleeding, and Bruises.")
3. Check for other injuries.
4. Provide rapid transportation to professional medical care. The location of the accident and the urgency of the situation should be considered in determining the kind of transportation to be used.
5. Ensure that only trained emergency personnel move the injured person. If the injured person must be moved immediately and trained emergency personnel are not available, splint the neck so that the head and body move as a single unit. This will protect the neck.

Unconsciousness

Although one does not have to know the causes of unconsciousness to render effective first-aid care, a general idea of the major causes of unconsciousness may help in understanding the problem.

The following are considered to be the "mechanical causes" of unconsciousness:

1. Increased pressure in the skull from swelling of the brain or from bleeding into the skull—This condition can develop following an injury or a stroke.
2. Diminished blood supply and/or lack of oxygen to the brain—This condition can develop from shock, drowning, or other factors that interfere with respiration.
3. Depression of the respiratory centers of the brain by drugs or poisons.
4. Emotional unconsciousness (not true unconsciousness).

In the treatment of an unconscious person, the person should be placed in a lying position, and tight clothing about the neck and chest should be loosened. Breathing should be checked, and an open airway should be maintained. If the injured person is not breathing, rescue breathing should be started at once. If the person is breathing, the person should be kept lying down on his or her side, with a pillow, a folded blanket, or an article of clothing placed under the head. The injured person should be watched for vomiting and should be given no fluids or food.

Anyone who loses consciousness should have a medical evaluation, and anyone who is unconscious for more than two minutes may be in urgent need of transportation to a medical facility for evaluation.

Fainting

Fainting is usually caused by a brief, temporary drop in blood pressure that deprives the brain of blood supply and oxygen necessary for maintaining consciousness. In cases of fainting the person should be lowered to a horizontal position; consciousness should return very quickly.

Fainting can also be caused by emotional problems. The treatment in such cases is the same general treatment already mentioned. There is no need to differentiate between the different types of fainting. Fainting from emotional causes may last longer than that caused by physiological problems.

The symptoms of fainting are dizziness, lightheadedness, and buzzing in the ears.

A person who is dizzy or light-headed or who has buzzing in the ears should lie down if possible. If this is not possible, the person should place his or her head between the knees until the symptoms subside.

Convulsions

Convulsions are caused by irritating impulses that spread over the brain, stimulating the centers that control the muscles. These impulses can arise from several sources: epilepsy, diabetes (low blood sugar), toxicity, head injury, and emotions.

Epilepsy

A person with epilepsy usually has a history of prior convulsions (fits) and may carry medicine for this condition. If a person suffering convulsions has no previous history of convulsions, the need for an immediate medical evaluation is indicated.

The following action should be taken in the case of epilepsy:

1. Do not restrict movement.
2. Prevent possible further injury by removing objects that the person might strike.
3. Loosen restrictive clothing.
4. Let the convulsion run its course.
5. Place a padded stick or similar rigid object between the person's teeth if this can be done easily. Do not try to force the jaws open.

Diabetes

Diabetics who take too much insulin for the amount of food they have eaten may develop low blood sugar, lose consciousness, and have convulsions.

The signs and symptoms of a diabetic with low blood sugar are as follows: Prior to lapsing into unconsciousness, the person may feel weak, may act dazed, and may try to eat a piece of candy.

If the victim is still conscious, the person should be given candy, fruit juice, soda pop (not the diet kind), or coffee or tea with much sugar. If the victim has lost consciousness, no food or drink should be given. The victim should be transported at once to a facility that gives medical care.

Toxic Conditions

Convulsions can be caused by fever, poisons, drugs, or alcohol. The actions to be taken are the same as for epilepsy.

Head Injury

Occasionally convulsions occur following a head injury. The actions to be taken in treatment of convulsions caused by head injury are the same as for epilepsy.

Emotional Causes

Occasionally behavior that is emotional in origin simulates convulsions. Even though these are not true convulsions, a medical evaluation is still needed.

TOPIC 9—SHOCK

This topic and the related instruction classes are designed to enable the apprentice to do the following:

- **Define the term *shock*.**
- **Discuss shock as it relates to roofing injuries.**
- **List the symptoms of shock.**
- **Describe the procedures that should be followed to control the effects of shock.**

Shock is a condition that affects circulation. When a person is in shock, the blood does not circulate correctly through the victim's body, and, therefore, the brain and other vital organs do not receive sufficient oxygen. The poorer the circulation, the greater the degree of shock.

Shock can result from any type of serious injury. All burns are accompanied by a certain amount of shock. Extreme pain or excessive bleeding can also cause shock. For example, when the femur (long leg bone) is broken, as in a fall, the pain and tearing of blood vessels near the broken bone can cause profuse bleeding in the muscle and result in shock.

Shock is a serious condition that may result in death. Shock is easier to prevent than to treat. Therefore, conditions that may have caused shock should be evaluated as to their possible effect on the individual exposed. Treatment for shock should be instituted immediately, even though the signs and symptoms of shock may not be present. Immediate action can prevent shock or considerably reduce its effect. A person sustaining a major injury, even though the person does not show signs of shock, should be treated for shock to prevent shock from developing.

The symptoms of shock include the following:

1. Cool, clammy skin, forehead, chest, or limbs
2. Pale skin, slightly bluish in color
3. Rapid and weak pulse
4. Shallow respiration, sometimes sighing in nature
5. Nausea and vomiting
6. Dizziness
7. Dull eyes, possibly listless in appearance, with pupils possibly dilated

The major objective in treating a person for shock is to improve the blood circulation to the brain. The following actions should be taken in treating an injury victim for shock:

1. Place the injured person in a horizontal position. However, the feet and legs may be elevated if this is comfortable for the injured person and if it is convenient to do so (see Fig. 9-1).
2. If possible, insulate the injured person from the ground or from a cold surface by placing a blanket, clothing, or other soft material underneath the body to reduce the loss of body heat. The injured person should be kept warm but should be prevented from getting hot. The use of a heating pad or a hot water bottle may be valuable in reducing the loss of body heat. However, great care should be taken to prevent burning the injured person. A general rule to use in covering a patient is to place two layers of material underneath the person for every layer on top. The injured person should not be made to perspire, because perspiring can cause further loss of body fluid and can aggravate shock. The surrounding temperature should be considered in determining the amount of covering to place on a possible shock victim.
3. If possible, maintain personal contact.
4. Comfort and reassure the injured person, because anxiety tends to increase shock.
5. Keep the injured person quiet.
6. If the injured person is unconscious, do not attempt to give the person anything by mouth.

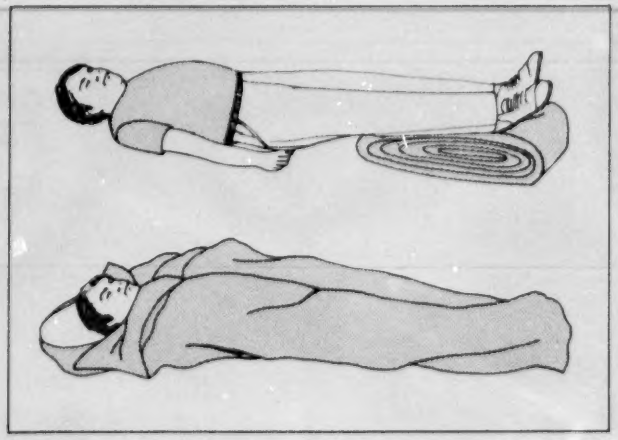

Fig. 9-1. Placing a shock victim in a horizontal position and making the victim comfortable

The injured person should be turned on the side so that if vomiting occurs, the person will not choke on the vomit.

7. If the victim is conscious, do not give the person any liquid to drink or food to eat, because eating or drinking may cause vomiting and increase the danger of choking on the vomit. Also, for certain kinds of medical treatment to be administered later, the person's stomach must be empty.
8. Check for injury. Shock is caused by some interference with bodily processes. Therefore, if you are unsure why shock has developed, check for injuries, as described earlier. Check especially for bleeding.
9. Do not give alcohol or drugs to the injured or ill person.

FIRST-AID TRAINING

TOPIC 10—MEDICAL EMERGENCIES

This topic and the related instruction classes are designed to enable the apprentice to do the following:

- **Describe the major symptoms of mild and severe poisoning.**
- **List the actions that should be taken immediately in cases of poisoning.**
- **List the major categories of drugs that are most commonly abused.**
- **Describe the symptoms of an overdose of each category of drug.**
- **Describe the treatment that should be given for an overdose of each category of drug.**
- **List the major conditions that would require emergency medical treatment.**
- **Describe the treatment that should be given to an individual who is vomiting.**
- **Describe the proper treatment for an individual suffering an insulin reaction.**
- **Describe how chest pain can be relieved.**
- **Distinguish between the symptoms of heat stroke and heat exhaustion.**
- **List the appropriate actions for assisting a person with heat stroke.**
- **Discuss the appropriate actions for assisting a person suffering from heat exhaustion.**

On a roofing job, as in any other type of work, medical emergencies may occur that are not necessarily related to the nature of the job. Poisoning, drug abuse, vomiting, chest pains, heat stroke, and other problems on the jobsite will require the attention of co-workers.

Poisoning

Poisoning constitutes a true emergency, and the fastest available help should be sought.

The symptoms of poisoning are too numerous and complex to discuss in detail in this book; however, the major symptoms that might be encountered in cases of poisoning are the following:

1. Nausea and vomiting
2. Drowsiness
3. Unconsciousness
4. Hyperexcitability
5. Disorientation or confusion
6. Abdominal pain
7. Impaired coordination
8. Convulsions

In cases of severe poisoning, breathing may stop, and rescue breathing should be started immediately.

The following actions should be taken immediately in cases of poisoning:

1. Encourage the victim to vomit. If the poisoning was caused by a pill or a solid substance, have the person stick a finger down the throat to induce vomiting. However, if the substance was a strong base, such as lye, or a strong acid, nothing should be done except to transport the victim to a medical facility as quickly as possible.
2. If breathing stops, begin rescue breathing.
3. If shock develops, treat the victim for shock.

Problems can occur from induced vomiting in persons who have taken liquid poisons. Therefore, it probably would be better to wait for trained medical care before a decision is made to induce vomiting in cases involving the ingestion of liquid substances. *NOTE:* If the victim is conscious, the victim should be asked what he or she took. The ill person may lapse into unconsciousness in the next few minutes. If containers are available from which the substance was taken or if some of the material is still present, the substance should be taken with the person to the place where he or she will receive medical care. Identification of the substance that caused the illness can be extremely important in the eventual treatment at a medical facility.

Drug Overdose

Drugs on which an individual may overdose may be taken by mouth, injection, or sniffing. All cases of drug abuse should be treated in a medical facility. Drugs involved in cases of drug abuse fall into the following three general categories:

1. *"Uppers"*—Uppers are usually considered stimulant drugs. They can cause silliness, hyperexcitability, confusion, and anxiety. These drugs can also cause the feeling in the drug abuser that someone is pursuing him or her with the intent to do bodily harm. Persons using uppers may be restless and irrational.
2. *"Downers"*—Downers are drugs that can cause sleepiness, reduced activity, depression, shock, and respiration failure.

3. *"Psychedelics"*—Psychedelic drugs can cause mental distortion. Sometimes they are pleasant in their effects, but sometimes they are terrifying (a drug reaction, or "bad trip"). The treatment for persons who have a bad drug reaction is to prevent excitement and reduce the amount of activity around the ill person as much as possible. Quietly assure the person that everything is all right and that he or she is simply having a bad drug reaction.

Although psychedelic drug overdose does not have the same potential for serious effects as overdose with the uppers and the downers, nevertheless, its potential for causing serious mental disorders is great. If the substance that was taken is available, a sample of the substance should be transported with the person so that an identification can be made and the most effective treatment can be given.

When bizarre, unexplainable behavior occurs in a person, drug ingestion should be suspected, and an evaluation by a trained medical person should be made.

Vomiting

Many things can cause vomiting: food poisoning, incorrect eating, stomach flu, medicines, and so forth. Vomiting sometimes can be associated with severe illness.

While vomiting, a sick person should bend over, and someone should hold the person's forehead if possible. When lying down and vomiting, a sick person should be on his or her side to reduce the chances of choking on the vomit.

When the retching has ceased, small sips of water or a soft drink in very small amounts may make the person feel better. The person should be given no more than a teaspoonful (5 millilitres) every five to ten minutes.

Diabetes

Many persons have diabetes (sugar in the blood) for which they must take insulin. Insulin helps the person's body to use the sugar in the blood properly. However, if the person has taken insulin and has not eaten correctly, an insulin reaction can occur. Such a reaction occurs when the insulin reduces sugar in the blood to a dangerously low level. When sugar in the blood drops to a certain point, convulsions will occur, causing a sudden, acute emergency. Diabetics often carry a candy bar, some sugar, or a soft drink for such an emergency. If the ill person does not have any of these items, candy, honey, juices, or nondiet soft drinks should be given as quickly as possible. These foods or drinks may prevent the sugar in the ill person's blood from dropping to a point where unconsciousness will occur. If unconsciousness does occur, no food or drink should be given, and the person should be transported as rapidly as possible to a medical facility where the correct medical care can be given.

Chest Pain

Crushing chest pain that radiates down the left arm, down both arms, to the shoulder, to the back, to the neck, or to the jaw is indicative of a possible heart attack. In an older individual particularly, chest pains may be the symptoms of a heart attack. An individual with any of these symptoms should be transported immediately to a medical facility for professional medical care. If the ill person stops breathing, rescue breathing should be given immediately. If the ill person's heart stops, a person trained in cardiopulmonary resuscitation (CPR) should begin heart compressions.

In younger people the sudden onset of severe chest pains, associated with shortness of breath, may be indicative of air escaping from the lung into the chest cavity (spontaneous pneumothorax). This condition is caused by the rupturing of a small air sac in the lung, allowing air to escape between the lung and the chest wall and collapsing the lung. Severe pains in the chest, with shortness of breath, can be serious and life-threatening.

The symptoms of heart attack and collapsed lung are the following:

1. Shortness of breath
2. Pain in the chest that radiates to arms, shoulders, back, neck, or jaw
3. Anxiety

When severe pain in the chest occurs, with shortness of breath, the ill person should be cared for as follows:

1. Keep the victim quiet.
2. Have the victim breathe gently and slowly.
3. Reassure the victim, and try to allay the victim's anxiety as much as possible.

Allergic Reactions

Allergic reactions may occur suddenly and may cause much discomfort. However, only a few such reactions are serious and life-threatening. Reactions such as hives, hay fever, swelling and burning of the eyes, and coughing may be uncomfortable, but transporting the ill person to medical care by conventional means is usually satisfactory.

Two allergic conditions can be extremely serious and may be life-threatening. These are allergic shock and allergic swelling.

Allergic Shock

Allergic (anaphylactic) shock is caused by exposure to a substance to which the individual is highly allergic. This condition can develop very rapidly. A common cause of allergic shock is bee stings. A person who has had a bad reaction to a bee sting on a previous occasion is likely to develop this condition if stung again. Another cause of this kind of reaction is medication to which the person is highly allergic. Penicillin is a common cause of allergic shock.

The signs and symptoms of allergic shock are the same as for other types of shock except that they may develop much more rapidly. Treatment for these symptoms is the same as the treatment for other types of shock. The major consideration in allergic shock cases is transporting the sick individual to medical care as rapidly as possible.

Allergic Swelling

The other serious allergic reaction that could develop suddenly in a person is allergic swelling (angioneurotic edema). Allergic swelling is a rapid swelling of the mucous membranes of the mouth and throat. Sometimes a person's lip, eye, cheek, or tongue will suddenly begin to swell. If this swelling is limited to the face, there is very little danger. However, if the throat begins to swell, breathing can be obstructed, and the person may suffocate. If the sick person stops breathing from swelling of the throat, rescue breathing may be extremely difficult, because the airway is blocked by the swelling. The onset of this condition involving the airway constitutes a grave and urgent emergency, and the sick person should be taken to professional medical help as rapidly as possible. No known first-aid measures will stop this swelling. However, the application of cold may help a little. Sometimes a person knows that he or she is subject to this kind of allergic reaction and will carry a syringe with medicine in it to stop the reaction. If a person is carrying such medication, the person should be helped to take it as rapidly as possible.

Heat Stroke

Roofing is physically strenuous, and sometimes the work is done when temperatures on the roof area climb to well over 100° F. (37.8° C). Heat stroke can occur under these conditions. The affected person is usually flushed, the skin feels warm to the touch, and the person's heart may beat rapidly and hard.

A person suffering from heat stroke must be cooled as effectively as possible by using the following procedure:

1. Move the ill person to a cool, shaded spot if possible.
2. Apply liberal quantities of cool water to the skin. The face, legs, arms, and exposed portions of the body must be bathed with cool water continuously until the ill person's condition has been evaluated by a medical practitioner.
3. If the ill person is conscious, give the person small sips of water or other cool liquid.
4. If cold packs are available, place these on the head and neck and next to the body.

Heat Exhaustion

Heat exhaustion differs from heat stroke in that the victim of heat exhaustion can lose excessive salt and fluid from the body, which can cause a state similar to shock.

The victim of heat exhaustion may be weak, have cool and moist skin, and have a weak and rapid pulse.

Heat exhaustion should be treated as follows:

1. Move the ill person from areas of excessive heat, such as bright sunshine, to a cool, shaded spot.
2. Give the ill person small sips of water or other cool liquid (Gatorade, for example) at frequent intervals. Salt tablets may also be given.
3. Keep the ill person in a lying position if possible.
4. Transport the ill person for a medical evaluation as soon as possible. Persons with heat stroke or heat exhaustion should be transported in a lying position for a medical evaluation and should be made as comfortable as possible.

FIRST-AID TRAINING

TOPIC 11—INJURIES TO THE EYES, EARS, AND NOSE

This topic and the related instruction classes are designed to enable the apprentice to do the following:

- **Classify the major injuries to the eyes, ears, and nose.**
- **Describe the symptoms of various types of eye injuries.**
- **List the actions that should be taken with various types of eye injuries.**
- **Demonstrate how to bandage a lacerated eye.**
- **Describe how small foreign bodies should be removed from the eye.**
- **Discuss the manner in which chemicals can be removed from the eye.**
- **State the symptoms of ear injury.**
- **Describe the actions that should be taken for ear injuries.**
- **List the symptoms of a broken nose.**
- **Describe how to care for a broken nose.**

The eyes, ears, or nose could be injured on a roofing job in a variety of ways. Most commonly injuries to these organs occur in falls or from being struck by falling objects or flying debris. (See appendixes E and F for additional information on safety in the industry.)

Eye Injuries

The eyes obviously are extremely important and special organs, and correct care in the event of an emergency involving the eyes may prevent serious impairment of vision or even blindness. Therefore, careful and prompt medical attention should be given to anyone sustaining an eye injury.

Blows to the Eyes

Injuries caused by blows to the eyes are potentially quite serious. The bones of the orbit of the eye may be fractured from blows, or blood vessels within the eye globe itself may be broken by blows, causing hemorrhage into the eyeball.

Evidence of injury caused by a blow to the eye includes bruises around the eye, cuts, swelling of the lid, or dilation of the pupil of the injured eye to a much larger size than the pupil of the uninjured eye. When this is detected in an unconscious person, a serious head injury should be suspected. In a conscious person with no other evidence of head injury, the most likely cause of dilation of the pupil in one eye is a direct blow to the eye.

For blow-type injuries to the eyes, general body rest is necessary to prevent bleeding into the eyeball. The injured person should be encouraged to lie down, and cold applications should be applied to the eye. The injured person should be transported immediately in a lying position to a medical facility.

Lacerations of the Eye

Sometimes foreign objects, such as splinters, glass, or wire, may enter the eye accidentally. No attempt should be made to remove the foreign object. Rather, the object should be immobilized, if possible, by wrapping voluminous bandages around it and the eye to prevent further movement of the object in relation to the eyeball. Both eyes must be bandaged to prevent motion of the injured eye (see Fig. 11-1). The injured person should be transported immediately in a lying position to the nearest medical facility where this condition can be treated professionally.

Scratches and Cuts of the Eye

Often the cornea (the clear part of the eye) becomes scratched or cut by some foreign object. Severe pain of the eye, spasm of the lid, and reddening of the eye are symptoms of scratches or cuts of the cornea.

Fig. 11-1. Applying a bandage for laceration of the eye

If the injury to the eye appears to be severe, the eyes should be bandaged. No attempt should be made to examine or treat the eye. The injured person should be transported as rapidly as possible to the closest medical facility.

Specks of dust, eyelashes, and similar small particles can easily get into the eye. Reddening of the eye, tearing, and spasm of the lids are symptoms of the presence of small foreign bodies in the eye. These can be removed by washing, or irrigating, the eye thoroughly. This may be done by having the affected person hold his or her head back, with the body in a sitting or lying position, and by pouring clean, cool water into the eye while holding the eyelids apart. The irrigating procedure may be done several times.

Another method of removing a foreign particle from the eye is to grasp the eyelashes between the thumb and forefinger, pull the upper lid out, and bring it down over the lower lid. The lower lashes will sometimes sweep out a small foreign body that is lodged under the upper lid. This procedure should be done very gently. If neither procedure is successful, the affected individual should be examined by a medical practitioner.

Chemicals in the Eye

Chemicals in the eye are extremely dangerous and must be removed immediately. The best treatment for chemicals in the eye is to wash, or irrigate, the eye with large amounts of water as quickly as possible (see Fig. 11-2). Following profuse irrigation of the eye for three or four minutes, a bandage should be placed over the eyes, and the affected person should be transported immediately to a medical facility.

Fig. 11-2. Irrigating the eye to remove chemicals

Ear Injuries

Injuries to the eardrum frequently occur from sharp objects' being pushed into the external ear canal.

The symptoms of ear injury include the following:

1. Pain in the affected ear
2. Possible bleeding from the affected ear
3. Possible loss of hearing in the affected ear

In the treatment for such an injury, a dressing should be placed over the ear to increase the patient's comfort during transportation to a medical facility. No other treatment should be given.

Broken Nose

A heavy blow to the face may break bones in the nose. Such an injury could occur from a worker's being struck with a piece of equipment or a tool used carelessly.

Crookedness, swelling, and bleeding are all signs of a possible broken nose. The following actions should be taken if a broken nose is suspected:

1. Apply cold compresses to the nose immediately to reduce the swelling.
2. Transport the injured person immediately to a medical facility.

Immediately following the occurrence of such an injury, a degree of numbness may be present. Straightening of the nose by a physician may be considerably easier and less painful at this time. A broken nose may not appear to be a serious injury; however, for the comfort of the patient, immediate medical attention is desirable.

TOPIC 12—BITES AND STINGS

This topic and the related instruction classes are designed to enable the apprentice to do the following:

- **Discuss the proper procedures to follow in treating the victim of an animal bite.**
- **Discuss the implications of being bitten by an animal with rabies.**
- **Describe the appearance of a black widow spider.**
- **Specify the treatment that should be given immediately to the victim of a spider bite.**
- **Demonstrate how a tick can be removed from one's skin.**
- **Discuss the implications of shock caused by a stinging insect, such as a wasp, bee, or yellow jacket.**
- **Identify the proper treatment for an individual who has been stung by a wasp, bee, yellow jacket, or other stinging insect.**

Because their work is done primarily outdoors, roofers and waterproofers frequently encounter various types of animals and insects on the job. Dogs, cats, spiders, bees, wasps, yellow jackets, and other types of insects and wildlife are common "visitors" to construction jobsites. Serious complications can result from animal bites, insect stings, and so forth. These types of injuries and emergencies are by no means as frequent as most of the others discussed in this manual, but they still warrant serious consideration in an apprentice's first-aid training.

Animal Bites

The greatest danger from animal bites is the danger of rabies' being transmitted to humans. Although pets may have been immunized against rabies, they must still be observed after they have bitten someone, to ensure that they are free from rabies. Rabies can be picked up by domestic animals from wild animals, such as skunks or squirrels, and then transmitted to people. In addition to rabies, animal bites are likely to result in infection; therefore, immediate medical care is essential.

Animal bites should be washed thoroughly with soap and water as soon as possible after the injury occurs (see Fig. 12-1). This is done to remove saliva and bacteria that have been introduced into the wound from the mouth of the biting animal. The animal that did the biting, whether domestic or wild, should be captured and contained in a box or pen to make possible an examination by a veterinarian. If capturing the animal alive is impossible, it should be killed without damaging the head, so that a pathologist or health official can determine whether rabies is present. The person capturing or killing the animal must be careful not to be bitten also.

Rabies is considered to be 100 percent fatal when it develops in human beings. Therefore, an animal that has bitten a person must be examined to determine whether it is rabid. If the animal were not examined, then a person that had been bitten would have to undergo a long and painful series of treatments to be immunized against the development of rabies. There is no way to tell whether the animal is rabid or not without a pathological examination. The assumption must be made that the animal that has bitten a person was rabid, and the person must be given these painful treatments. Therefore, it is extremely important that the animal be captured or killed so that it can be examined.

Insect Bites or Stings

Insects that bite or sting include spiders, scorpions, ticks, wasps, bees, and some other flying insects. These insects can cause poisoning, infection, disease, and allergic shock.

Fig. 12-1. Washing an animal bite to remove saliva and bacteria

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Spider Bites

Spider bites can sometimes be quite serious, and they should be evaluated by a health professional. The black widow spider is notorious for causing severe symptoms. The black widow can be recognized by its black glossy body and a red hourglass marking on the abdomen. If a person is bitten by a black widow spider, cold compresses should be applied to the area of the bite, and the person should be transported immediately to a medical facility for treatment.

A number of other spiders and scorpions found in California can cause relatively severe symptoms. However, any spider bite that apparently causes a great deal of pain, swelling, and shock symptoms should be considered serious; and any person bitten by one of these should be transported immediately to a medical facility for treatment. The only immediate first-aid care that can be given for such a bite is the application of cold compresses.

Tick Bites

Wood ticks embed themselves in the skin, and they suck blood until they become quite puffed up and blue with blood. They are dangerous because they can transmit diseases, such as Rocky Mountain spotted fever. The treatment for ticks is the application of a small piece of cotton or tissue that has been saturated with gasoline or kerosene (see Fig. 12-2). This treatment will stop up the breathing apparatus of the tick, and within a few minutes the tick will release its grip. The tick can then be removed from the skin without difficulty. If this treatment does not work, a health professional should remove the tick.

Wasp, Bee, and Yellow Jacket Stings

Bees, wasps, yellow jackets, and the like are often found around the eaves of roofs. These and other flying insects may sting and cause a great deal of pain and discomfort. The main danger from stings is the development of allergic shock, which can cause a person to go into severe shock and die. As for treating the sting itself, cold should be applied to the area that has been stung to help relieve some of the initial symptoms. If multiple stings have occurred, the victim must be evaluated by a health professional and treated whether he or she shows symptoms of shock or not. Symptoms that may develop after multiple stings are nausea, vomiting, fever, and headache.

Fig. 12-2. Removing ticks

A FINAL NOTE

As responsible members of the roofing and waterproofing industry, all apprentices should review the information presented in this workbook and commit to memory as much of it as possible.

A career in the roofing and waterproofing profession can be very rewarding, but it can also be very hazardous. It is therefore in the best interest of all workers in the industry for apprentices to learn as much as possible about first-aid practices. The knowledge and skills gained now may very well be instrumental in saving a co-worker's life or preventing further harm to a co-worker someday.

The following, then, are a few brief, but important, tips for the apprentice to remember:

1. Avoid harming an injured party further. Doing nothing is better than doing the wrong thing.
2. Remember that with all injuries and illnesses, various degrees of anxiety are present. Comfort, support, and reassurance are the most valuable first-aid measures available.
3. Remember to evaluate the total situation and to establish priorities for treatment on the basis of threats to the life and the recovery of the ill or injured individual. Problems with breathing, heartbeat, circulation, bleeding, and shock are the main threats to life. Infection and aggravation of injuries, such as fractures, are the major threats to recovery.
4. Intelligent evaluation of the transportation needs of the ill or injured person is as important as the treatment. Use common sense in determining how and when an ill or injured person should be moved. Even if excellent emergency care is given at the site of the injury, the victim could end up in the hospital with more severe injuries because of having been moved incorrectly. This situation can be especially true of persons with fractures. Incorrect handling and transporting can cause a simple fracture to become a compound fracture, or someone with a spinal cord injury to become paralyzed.
5. Gather all the appropriate information possible about the circumstances and the condition of the ill or injured person. Consider communication as a vital link in first-aid care. Be sure that the important information is transmitted to the physician who will be giving the professional medical care. If possible, establish a communication link with a health professional while at the scene of the illness or accident. Do this either by telephone or radio. Also determine whether additional instructions will facilitate the care of the person.
6. Learn cardiopulmonary resuscitation (CPR) from your local fire department, hospital, community college, or other agency.
7. Keep this book handy for use as a reference. First-aid kits and fire extinguishers should also be kept handy and should be checked regularly.
8. Do not expect to perform miracles. Even physicians recognize that they are limited in their ability to help some patients. You can help people when they become sick or injured only within the skill and knowledge that you have acquired. In some cases this skill and knowledge may enable you to save a person's life. In other cases it may enable you only to provide comfort and reassurance and prevent additional injury.
9. Learn the material in this manual as thoroughly as possible, and review it frequently.
10. Take a standard and an advanced Red Cross first-aid course if possible.

Instructional Materials

CAL/OSHA State of California Construction Safety Orders (Current edition). Los Angeles: Building News, Inc. (Orders to: Building News, Inc., 3055 Overland Avenue, Los Angeles, CA 90034.)

Griffin, C. W. *Manual of Built-up Roof Systems.* New York: McGraw-Hill Book Company, 1970. (Orders to: McGraw-Hill Book Company, 1221 Avenue of the Americas, New York, NY 10020.)

Handbook of Accepted Roofing Knowledge. Oak Park, Ill.: National Roofing Contractors Association, 1980. (Orders to: National Roofing Contractors Association, 1515 North Harlem Avenue, Oak Park, IL 60302.)

Appendix A

Safety Tips for Working with Hotstuff

1. Wear protective clothing, including a long-sleeve work shirt made from cotton or wool (not synthetics), pants *without* cuffs and long enough to cover the tops of the shoes, and sturdy work shoes (not tennis shoes). In most cases gloves and a face shield will also be necessary.
2. When filling buckets or other carriers, shut off the flow *before* checking the level. Always open valves and drain cocks *slowly*.
3. Close the cover of the kettle before moving it, and keep the cover on except when adding material.
4. When moving hotstuff, look where you are going. Keep within safety lines and guardrails, and concentrate while pouring.
5. Do not fill kettles higher than 4 inches (10.2 centimetres) from the top. When adding asphalt or coal-tar pitch, slide the material *gently* into the kettle to avoid splashing. Do not add the whole carton at once; instead, break the material into smaller chunks, and add one piece at a time.
6. Never hurry when carrying hotstuff. Keep your mind on what you are doing.
7. Carry mops with the handles straight up to avoid hitting or bumping into anything.
8. When carrying hotstuff behind someone, call out, "'Hot' behind you!"
9. Lift buckets filled with hotstuff slowly and carefully. If a bucket is stuck to spilled hotstuff, gently pry it loose. *Never jerk it free!*
10. Remember that freshly mopped hotstuff is as slippery as ice and that felt laid over it will slip easily. Therefore, do not walk on freshly laid felt.
11. Vapors from hot coal-tar pitch are toxic. Protect the skin with clothing or a lanolin-based cream. Wash exposed areas thoroughly before lunch and after work.
12. Know the exact location of water buckets and fire extinguishers.
13. Make sure that all equipment for handling hotstuff is in good condition. Use buckets with safety handles or bales. Check pipeline connections, and provide adequate support for pipelines carrying hotstuff.
14. On sloped surfaces carry buckets of hotstuff in the hand nearest the downhill side.
15. Remember to press out mops at night, spin them so that they flare out, place them on a noncombustible material, and sprinkle them with cool water.

Appendix B

Safety Tips for Working with Cold-Process Materials

1. Watch the temperature of the preheater carefully to avoid a flash fire.
2. Keep hose joints on spray applicators tight to avoid rupture. Remember that hoses are under presssure; keep them under control.
3. On windy days when sprays tend to mist, wear a mask and goggles.
4. Work upwind, if possible, to avoid breathing solvent vapors.
5. Simple dust masks or handkerchiefs are not effective protection. Use gas mask respirators with organic vapor cannisters, or chemical cartridge respirators with organic vapor cartridges.
6. To prevent solvents from coming into contact with the skin, use a squeeze bottle or paint brush to apply them. Avoid using solvent-soaked rags.
7. Wear protective gloves that cannot be penetrated by harmful chemicals. Leather and cloth gloves are not good, since they tend to soak up solvents.
8. To prevent overexposure to harmful substances, switch jobs with another worker every few hours.
9. Wear goggles to protect eyes from splashes. If solvent does enter the eyes, flush them out with water immediately.
10. When the work area cannot be kept free of fumes and spray mists by natural or fan-assisted ventilation, wear air-supplied respirators if required to do so.

Appendix C

Safety Tips for Working at Heights and on Hoisting Equipment

1. Never back toward roof edges or the edges of roof openings.
2. Do not pass through guards unless instructed to do so by a supervisor.
3. Always work leaning away from edges.
4. Wear safety lines or harnesses when necessary.
5. *Never* cover an opening with felt and walk away—even for a few seconds.
6. Be sure that appropriate warnings and guardrails are placed around all openings and skylights.
7. Keep away from hoists and lifts unless they are supervised.
8. Be sure that two roofers are present in the operation of a hoist—one on the roof and one on the ground.
9. Make sure that hoists have safety catches.
10. If working on the roof with a hoist, make sure the partner on the ground is ready to receive the load.
11. Do not lean on hoist railings.
12. Brake hoists smoothly; a sudden stop could break a rope.
13. Do not try to save time by overloading the hoists.
14. If a hoist rope looks frayed, show it to the supervisor.
15. Never ride a hoist.
16. Never move a forklift when the load is raised.
17. Never lean over the roof's edge to receive material from a forklift.
18. Make sure that guardrails and warning signs are posted at all loading points.
19. Never stand on the forklift fingers; keep your feet on the roof.

Appendix D

Safety Tips for Working with Ladders

1. Never use an unsafe ladder. Check for broken rungs, splintered side rails, and so forth.
2. Use a ladder that is right for the job. Ladders should extend at least 3 feet (91.4 centimetres) above a roof or platform.
3. Enlist the aid of another worker to put a large ladder in place.
4. Place the base of the ladder 1 foot (30.5 centimetres) out from the wall for every four rungs of height.
5. Be sure that both feet of the ladder are on a level base.
6. Never go on a ladder when someone else is on it.
7. In climbing a ladder, use both hands and both feet; keep the body weight inward toward the ladder.
8. Do not climb a ladder while carrying equipment or material.
9. Wear a hard hat when climbing on a ladder.

Appendix E

Miscellaneous Safety Tips

1. When lifting heavy loads, lift with the legs, not the back, and do not attempt a lift that looks too heavy for one person.
2. To avoid tripping over materials later, pick up miscellaneous debris as you work.
3. On steep roofs wear shoes with nonskid gripper soles; work flat-footed to avoid slipping; keep the weight on the lower foot when walking across the roof; and if you start to slide, lie flat; do not roll.
4. Watch out for special safety hazards on old roofs: rotten decking, an accumulation of dirt, and slippery leaves and moss.
5. When using power tools, be careful not to trip over wires. Hold power saws securely so that they do not "walk" away. Be sure tools are grounded before using them, and always turn off a tool before repairing or cleaning it.

Appendix F

Article 30, *Construction Safety Orders*, "Roofing Operations and Equipment"

(*NOTE:* The *Construction Safety Orders* are subject to change from time to time. Employers are responsible for notifying employees of any pertinent revisions.)

1723. Application.

(a) The Orders contained in this Article are intended to apply to employees engaged in the removal or application of:

(1) Single-unit (Monolithic) roof coverings include built-up roofing of asphalt or coal-tar pitch or like materials, and flat-seam metal roofings or like materials, and

(2) Multiple-unit roof coverings include asphalt shingles, asbestos-cement shingles, standing-seam metal panels, shingle metal roofing, wood shakes and shingles, clay tile, concrete tile, slate or like materials.

(b) Applicable parts of this Article shall apply wherever kettles, tankers or pots with capacities in excess of 5 gallons are used in providing hot asphalt, pitch or like materials for construction or maintenance operations.

(c) When the work is of short duration and limited exposure, such as minor patching, measuring, roof inspection, etc., and the hazards involved in rigging and installing the safety devices required by this Article equals or exceeds the hazards involved in the actual construction, these provisions may be temporarily suspended provided that adequate risk control is recognized and maintained.

NOTE: See Appendix for additional information on roofing safety.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

HISTORY

1. Repealer of Article 30 (Sections 1725–1730) and new Article 30 (Sections 1723–1730) filed 6-6-80; effective thirtieth day thereafter (Register 80, No. 23). For prior history, see Registers

1724. Roofing—General.

(a) Roof Jack Systems.

(1) Roof jacks shall be constructed to fit the slope of the roof and be designed, fabricated and installed in such a manner that they will sustain all expected loads.

(2) Intervals (spans) between roof jacks shall not exceed 10 feet.

(3) Roof jacks shall be installed in the manner for which they were designed.

(4) When rope supports are used, they shall consist of first-grade Manila rope of at least ¾-inch diameter or other material of equivalent strength.

(5) Wooden supporting members that span between jacks, as illustrated in Appendix Plate C-19, shall be carefully selected for strength and be of at least 2-inch by 6-inch material. Where supporting members other than wood are used they shall be of at least the equivalent strength.

(b) Crawling Boards (Chicken Ladders).

(1) Crawling boards shall be not less than 10 inches wide and 1-inch thick, and shall have cleats of at least 1 by 1½-inch material. The cleats shall be equal in length to the width of the board and spaced at equal intervals not to exceed 24 inches. Nails shall be driven through and clinched on the underside of the board.

(2) Where building design permits, the crawling boards shall extend from the ridge pole to the eaves.

(3) A firmly fastened line of at least ¾-inch diameter Manila rope, or equivalent, shall be laid beside each crawling board for use as a handhold.

(4) Crawling boards shall be secured to the roof by adequate ridge hooks or other effective means.

(c) Catch Platforms.

(1) When catch platforms are used, they shall be installed in close proximity below the eaves below roof work areas, extend at least 2 feet horizontally beyond the projection of the eaves, and be provided with standard railings and toeboards (See Article 16).

(2) The platforms shall be fully planked.

(d) Scaffold Platforms.

(1) When built-up scaffold platforms are used to protect workers from falls from the edges of roofs, they shall be installed and maintained in accordance with the provisions of Article 22, Scaffolds.

(2) A fully planked platform, complete with railings and toeboards, shall be provided near the eave level.

(e) Eave Barriers.

(1) When a system of eave barriers is provided to prevent falls from roofs, the barrier shall be 42 to 45 inches high and consist of standard railings and toeboards unless of solid construction (See Article 16).

(2) The barrier system shall be securely anchored at eave level or supported by ropes securely tied to substantial anchorages on the roof.

(3) If the barrier system is to be moved from one work area to another, employees performing the moving operation shall be protected by the use of safety belts and lines.

(f) Safety Belts and Lines.

(1) Where used to prevent workers from falling off roofs, safety belts and lines shall be installed and used in accordance with the provisions of Article 24, Safety Belts and Nets.

(2) Safety lines shall be attached in a secure manner to substantial anchorages on the roof.

(g) High-Lift Material Trucks. Standard railings and toeboards shall be provided on the open sides of the platforms of high-lift material trucks when the platform is used as a work surface, other than for loading or unloading purposes, at elevations 7½-feet or more above ground, floor or level underneath.

(h) Ramps and Runways.

(1) Ramps or runways erected exclusively and used for the purpose of loading or unloading roofing materials at elevations above ground, or other level below, not exceeding 20 feet in height shall be at least 40 inches in width. At those elevations exceeding 20 feet in height, standard guardrails shall be installed and maintained on both sides of the ramp or runway.

NOTE: A 10-inch wide horizontal opening is permitted between the railing and the ramp or runway platform.

(2) Runways or ramps shall be secured against displacement and shall be supported to avoid excessive deflection or springing action.

(3) Securely fastened cleats or other adequate provisions to provide traction shall be used on inclined ramps and runways sloped 2 feet in 10 feet or more to improve footing.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

1725. Handling of Buckets, Kettles and Tankers.

(a) Buckets containing hot asphalt or pitch shall not be carried on ladders.

(b) Not more than one bucket of hot asphalt or pitch shall be carried at one time by a worker on a roof having a slope ratio of 6 vertical in 12 horizontal (6:12) or steeper.

(c) Buckets used in carrying service shall not be filled so full that the liquid surface is within 4 inches of the top. No other open container transporting hot asphalt or pitch shall be filled beyond 75 percent of capacity.

(d) An attendant shall be within 100 feet of a kettle or tanker at all times while the burner flame is on, with no ladders or similar obstacles forming a part of the route to be taken to reach the kettle or tanker. However, if the kettle or tanker is controlled by an operating thermostat, the above distance and route limitations do not apply, provided that arrangements are made for needed service.

(e) A clear path, free of debris, shall be maintained between the kettle and the hoist or hand line.

(f) When moving the kettle on any public street or roadway, it shall be drained at least 5 inches below the splash rail.

(g) When in use, the LPG fuel container shall be installed so that the heat from the burner will not increase the temperature of the container more than 10 degrees Fahrenheit after one hour of operation of the burner at full capacity.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

1726. Asphalt and Pitch Kettles.

(a) The covers on kettles shall be constructed to close tightly and the kettles shall have vents providing a total open area of not less than 5 square inches. All kettles used by employees shall be in compliance with the provisions of Section 1726(h) by July 1, 1983.

(b) Kettles shall be equipped with adjustable supports for use in setting kettles so that they are prevented from turning over.

(c) Relief Valve. The fuel tank of every kettle that depends upon the pressure of power-pumped (machine compressed) air for fuel delivery shall be equipped with a spring-loaded relief valve set to pop at a pressure not to exceed the maximum safe working pressure of the vessel, but in no case greater than 60 pounds per square inch.

(d) A Class BC fire extinguisher shall be kept near each kettle in use. Extinguisher capacity shall be at least as follows:

Less than 150 gallons	8:B.C.
150 to 350 gallons	16:B.C.
Larger than 350 gallons	20:B.C.

(e) An extension handle of sufficient length to permit safe closing of a stuck spigot shall be accessible near the kettle at all times.

(f) Kettle and tanker pumps shall be provided with a means of stopping the flow of hot asphalt or pitch manually from the roof top in emergencies when an attendant is not provided within 100 feet horizontally or 20 feet vertically from the kettle or tanker.

(g) Pumper pipelines shall be securely fastened at roof top and shall not be supported by ladders used for access.

(h) New kettles purchased and placed in service after the effective date of these Orders shall have the following safety features:

(1) A fluid level indicator, such as a dipstick, that will indicate the level of liquid asphalt or pitch within the kettle without the necessity of opening the lid for direct observation.

(2) Vents providing a total open area of not less than 100 square inches for up to 200 gallons capacity and not less than 200 square inches for kettles of larger capacities.

NOTE: See Sections on LP-Gas use, Article 32.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

1727. Kettles Mounted and Used on Elevated Truck Beds.

(a) Platforms must be designed and constructed to:

(1) Carry imposed load without excessive tipping or distortion.

(2) Provide a clear work area at least 4 feet wide at the accessible sides and ends of the kettle, including an unobstructed 4-foot passageway between the kettle spigot and the roof.

(3) Provide a noncombustible platform or platform covering.

(b) An access ladder to the platform must be provided. This ladder shall be fixed or be provided with an easily engaged attachment bracket that will prevent ladder slippage. Ladder rails must extend 30 inches above the platform, unless adequate handholds above the platform are provided.

(c) A railing 42 inches to 45 inches high with midrail shall be provided around the edges of the platform.

(d) The platform shall be kept reasonably free from asphalt or pitch drippings.

(e) Kettle covers shall be closed when the truck is in motion.

(f) Kettles shall be securely attched to the platform so they will not shift or tip.

(g) Kettle burners must be extinguished when the truck is moving.

(h) No riders are to be allowed on the elevated platform while the truck is in motion.

(i) Platforms which can be raised and lowered shall be locked in place when in an elevated position.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

1728. Handling Coal Tar Pitch.

(a) When coal tar pitch is being handled, suitable skin protection substances shall be readily available at the job site for the use of workers, and workers shall be instructed in its use in accordance with Section 1510.

(b) Suitable respiratory and eye protection shall be readily available to workers handling coal tar pitch in confined spaces where ventilation is inadequate to promptly dissipate the fumes and vapors.

(c) Suitable washing or cleansing facilities shall be available for use on exposed skin surfaces of those handling coal tar pitch.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

1729. Hot Asphalt and Hot Pitch Buckets and Gallows-Type Frames.

(a) Hot Asphalt and Hot Pitch Buckets.

(1) Every hot asphalt and hot pitch bucket shall be made of No. 24 gauge or heavier sheet steel and shall have a metal bail of ¼-inch diameter or larger material. The bail shall be fastened to offset ears, or equivalent, which have been riveted, welded, or otherwise securely attached to the bucket.

(2) Mop buckets shall not have a capacity in excess of 9½ gallons.

(3) Mop buckets shall not be used as carrying buckets.

(4) Carrying buckets shall not have a capacity in excess of 6 gallons.

(b) Gallows-Type Frames.

(1) Gallows-type frames shall be made of "selected lumber", or material of equivalent strength, firmly bolted or nailed together and may be job site fabricated or a manufactured assembly. Construction may be as illustrated in Plate C-18, Appendix, or alternate designs may be used provided equivalent or greater strength is afforded.

(2) Gallows-type frames shall be securely tied back to solid construction on the roof at all times while in use or in the case of designs incorporating counterbalancing means, shall be counterbalanced with items or materials which will not be used in performing the work which is being done during the period the hoist is being used.

(3) If a tieback is used, the tieback shall be of Manila rope not less than ⅜-inch in diameter, or equivalent, tied securely to the tailpiece, stretched tight and lashed to an object on the roof suitable to provide secure anchorage to hold the frame in place when loaded.

(4) Gallows-type frames are for single line hand use and muscle power only. Any attachment of a power system, winch, hoist, or blocks and falls is prohibited, unless the system complies with Article 15, Section 1613 of these Orders.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

1730. Roof Hazards.

(a) During roofing operations, provisions shall be made to prevent workers from falling off roofs in accordance with Section 1509 of these orders.

(b) Slopes 0:12 to 4:12—Single-Unit (Monolithic) Roof Coverings.

(1) Employees shall be protected from falls from the edges of roofs that are at a height of more than 20 feet from ground or level below to the eave level without a parapet by the use of a combination of warning lines and headers unless conditions prohibit the use of a header, in which case, warning lines alone may be used. Whenever felt laying machines or other equipment that is pulled by an operator who walks backwards is being used, this provision shall apply regardless of the height.

(2) Warning lines consisting of rope, wire or similar material, flagged with bits of highly visible material hanging from the warning lines at approximately 6-foot intervals, shall be installed 42 to 45 inches above the roof surface to warn employees that they are approaching the edge of the roof.

(A) The stanchions (portable or fixed) supporting the warning lines shall be designed and installed to minimize tip over or displacement under normal working conditions.

(B) Warning lines shall have a minimum breaking strength of 100 pounds.

(3) Unless conditions prohibit, headers consisting of sheets of roofing or other roofing materials shall also be laid parallel to the edges of the roof to warn employees that they are approaching the edge of the roof.

(4) The warning lines and headers shall be placed no closer than 5 feet from the roof edge.

(5) When using felt-laying machines or other equipment that is pulled by an operator who walks backwards or motorized equipment on which the operator rides, the headers shall be placed no closer than 10 feet and the warning lines shall be placed no closer than 5 feet from those roof edges that are perpendicular (or nearly so) to the direction in which the operator is moving and when conditions prohibit the use of headers, the warning lines shall be placed no closer than 10 feet from these roof edges that are perpendicular (or nearly so) to the direction in which the operator is moving.

(6) The warning lines and headers shall be erected either around the complete perimeter of the roof or only in areas of the roof where work is being accomplished, so long as the warning lines and headers are moved as the work progresses in such a manner as to provide continuous warning to employees in the work area when they approach the roof edge.

(7) Employees shall be instructed to stay inside the warning lines and headers except when work must be performed at the roof edge.

(8) Application of materials outside the warning lines shall be closely supervised by a qualified person.

(9) On narrow roofs and roofs of unusual shape where warning lines and headers would be impractical, the application of materials shall be closely supervised by a qualified person.

NOTE: The provisions of Subsection (b) do not apply when employees are protected by the use of one, or a combination of, of the following methods:

Safety Belts and Lines [Section 1724(f)].
Catch Platforms [Section 1724(c)].
Scaffold Platforms [Section 1724(d)].
Eave Barriers [Section 1724(e)].
Standard Railings and Toeboards (Article 16).
Parapets at least 24 inches high, except that at those job sites where felt-laying machines or other equipment that is pulled by an operator who walks backwards or motorized equipment on which the operator rides is being used, the provisions of this Subsection shall not apply provided that the parapet is 36 inches or more in height at those roof edges which are perpendicular (or nearly so) to the direction in which the equipment is moving.

(c) Slopes Greater Than 4:12—Single-Unit (Monolithic) Roof Coverings. Employees shall be protected from falls from the edges of roofs that are at a height of more than 20 feet from ground or level below to the eave level without a parapet by one or a combination of the following methods:

Safety Belts and Lines. [Section 1724(f)].
Catch Platforms [Section 1724(c)].
Scaffold Platforms [Section 1724(d)].
Eave Barriers [Section 1724(e)].
Standard Railings and Toeboards (Article 16).
Work platforms such as roof jack systems [Section 1724(a)] or crawling boards [Section 1724(b)] provided that a perimeter barrier at least 30 inches high is erected below the working area.

NOTE: The provisions of this Subsection (c) do not apply under the following conditions:

1) When employees are protected from falls from the edges of roofs by a parapet at least 24 inches high, or

2) At those job sites where motorized equipment on which the operator rides which has been designed for use on roofs of slopes greater than 4:12 is being used if the parapet is 36 inches or more in height at those roof edges which are perpendicular (or nearly so) to the direction in which the equipment is moving.

(d) Equipment Hazards on Sloped Roofs—Single-Unit (monolithic) Roof Coverings. Equipment that is pulled by an operator who walks backwards shall not be used on a roof having a slope greater than 4:12.

(e) Slopes 0:0 Through 5:12—Multiple-Unit Roof Coverings. Employees shall be protected from falls from the edges of roofs that are at a height of more than 20 feet above ground or level below to the eave level without a parapet by the use of a roof jack system as provided in Section 1724(a) or other method affording equivalent protection, such as crawling boards as provided in Section 1724(b).

(f) Slopes Greater Than 5:12—Multiple-Unit Roof Coverings. Employees shall be protected from falls from the edges of roofs that are at a height of more than 20 feet above ground or level below to the eave level without a parapet by one or a combination of the following methods:

Safety Belts and Lines. [Section 1724(f)].
Catch Platforms [Section 1724(c)].
Scaffold Platforms [Section 1724(d)].
Eave Barriers [Section 1724(e)].
Roof Jack Systems [Section 1724(a)].

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Roofing

First-Aid Training

Tests

The following section contains objective tests for each topic of the workbook. The value of the tests depends to a great extent on the care taken by instructors and school supervisors in keeping them confidential.

Supervisors and instructors should feel free to modify the application of the workbook material and the tests to satisfy local needs. Also, the instructors will probably supplement the information in the workbook with other material that they themselves have developed, and they will need to augment the tests with questions based on any supplementary material they may use.

Instructors and supervisors should be aware that the test pages are perforated to facilitate removal of the tests, either individually or as a complete set, at the discretion of the instructor or supervisor.

First-Aid Training Tests

TOPIC 1—INTRODUCTION TO FIRST-AID PRACTICES

Decide which of the four answers is correct, or most nearly correct; then write the corresponding number in the blank at the right.

1. Almost one-third of all injuries in the roofing and waterproofing industry involve: 1. ____

   1. Fractures
   2. Strains and sprains
   3. Burns
   4. Falls

2. The first step in formulating a plan of action for care of an injured person is to: 2. ____

   1. Check for bleeding.
   2. Check for breathing.
   3. Check for neck or back injuries.
   4. Call for medical assistance.

3. It is recommended that roofers and waterproofers have with them at all times: 3. ____

   1. A first-aid kit
   2. A portable fire extinguisher
   3. The names, phone numbers, and addresses of local personnel and agencies qualified to administer medical care
   4. Maps showing the best routes to local health care facilities

4. The majority of sprains suffered by roofers and waterproofers are in which area of the body? 4. ____

   1. Legs
   2. Arms
   3. Groin
   4. Back

5. If an injured person is not breathing, those administering care to the person should immediately: 5. ____

   1. Determine the best method for transporting the person to a hospital.
   2. Check for heartbeat.
   3. Check the area for escaping poisonous gases.
   4. None of the above.

6. In treating an injured or ill person, it is most important to: 6. ____

   1. Determine the person's next of kin.
   2. Determine the name of the company that provides health insurance to the individual.
   3. Avoid doing further harm to the victim.
   4. Avoid doing anything that might result in a law suit later.

7. A person providing care to a victim of electrical shock should first: 7. ____

   1. Be sure he or she is wearing shoes with rubber soles.
   2. Make sure the power source that caused the shock has been turned off.
   3. Ensure that the victim has not swallowed her or his tongue.
   4. Carry the victim to a dry area.

8. An ambulance should be called if an injured party has: 8. ____

   1. An injury to neck or spine
   2. Head injuries
   3. Serious burns
   4. All of the above

9. Decisions about how to care for a sick or injured person should be based on: 9. ____

   1. An evaluation of the overall circumstances related to the injury or illness
   2. The victim's religion
   3. The distance to the nearest hospital
   4. The possible legal implications of providing care

10. In cases of injury to two or more persons, which of the following is most important in the decision-making process? 10. ____

    1. Establishing positive identification of all victims
    2. Determining which victims are union members
    3. Establishing the order in which the victims need and should receive care
    4. None of the above

FIRST-AID TRAINING TESTS

TOPIC 2—BURNS

Decide which of the four answers is correct, or most nearly correct; then write the corresponding number in the blank at the right.

1. Burns commonly suffered by roofers and waterproofers include which of the following? 1. ____

   1. Burns from hotstuff
   2. Electrical burns
   3. Chemical burns
   4. All of the above

2. Burns involving only the outer layer of skin are classified as: 2. ____

   1. Fourth-degree burns
   2. Third-degree burns
   3. Second-degree burns
   4. First-degree burns

3. The first step to take in treating a victim of a resinous or thermoplastic burn is to: 3. ____

   1. Cool the burned area as rapidly as possible by applying cool water.
   2. Treat the victim for shock.
   3. Call a physician.
   4. Remove the burning material from the skin if it has stuck to the skin.

4. Chemical burns to the skin can be flushed with which of the following? 4. ____

   1. Milk
   2. Iced tea
   3. Water
   4. All of the above

5. If a victim of electrical shock is still in contact with the source of electricity and the electricity cannot be shut off, which of the following should the care provider do first? 5. ____

   1. Phone for emergency medical help.
   2. Use a stick or board wrapped in a nonconductive material to pry the victim loose.
   3. Immediately drag the victim away from the source of the shock by the victim's feet.
   4. None of the above.

6. Which of the following should not be given to a burn victim who appears to be in shock? 6. ____

   1. Coffee
   2. Whiskey
   3. Tea
   4. Water

7. All burns result in some degree of shock. A shock victim should be: 7. ____

   1. Kept cool
   2. Given a depressant
   3. Placed in a sitting position
   4. Placed in a position in which the head is level with the feet

8. Which of these statements about hotstuff burns and their treatment is *false?* 8. ____

1. Butter or grease should be placed over the burned area.
2. The burned area should be bandaged loosely.
3. Hotstuff that is stuck to the skin actually provides protection against infection.
4. Clothing should not be cut away from the burned areas.

9. A person with moderate to severe burns who will be treated by a physician within an hour should be: 9. ____

1. Given large swallows of cool water every few minutes
2. Given large quantities of warm liquids every few minutes
3. Given nothing to eat or drink
4. Given high protein food but no liquids

10. If a dressing for a burn should dry out: 10. ____

1. It should be replaced with a new dressing.
2. Water should be poured over it.
3. Another dressing should be applied over it.
4. It should be left in the dry condition.

FIRST-AID TRAINING TESTS

TOPIC 3—SKELETAL INJURIES

Decide which of the four answers is correct, or most nearly correct; then write the corresponding number in the blank at the right.

1. Which of the following is *not* considered proper treatment for a cramp or muscle spasm? 1. ____

   1. Gentle movement of the affected part in the opposite direction from the side of the cramp
   2. Application of heat on the affected area
   3. Application of cold compresses on the affected area
   4. All of the above

2. Cold should be applied to the area of a muscle pull during the first how many hours after the onset of the muscle pull? 2. ____

   1. One
   2. Three
   3. Nine
   4. Ten

3. The signs and symptoms of a fracture include which of the following? 3. ____

   1. Swelling
   2. Pain
   3. Tenderness
   4. All of the above

4. All instances of fracture involve: 4. ____

   1. Some degree of shock
   2. Bleeding
   3. Inability of the victim to move the fractured part
   4. All of the above

5. In most cases a fracture should be splinted: 5. ____

   1. Before the injured party is moved
   2. In the ambulance
   3. Only at a health care facility
   4. None of the above

6. Fractured elbows and knees should be splinted: 6. ____

   1. In the correct position
   2. In whatever manner is convenient at the time of the emergency
   3. In the position in which they are found
   4. In the same manner as an upper arm fracture

7. If a fractured bone is protruding through the skin: 7. ____

   1. It should be forced back inside the skin.
   2. It should be covered with a clean bandage.
   3. It should be left as found.
   4. It should be splinted immediately upon discovery.

8. Which of the following is appropriate treatment for a fracture of the thigh? 8. _____

   1. Applying a bubble splint
   2. Immobilizing the victim on a door
   3. Applying hot compresses to the area of the fracture
   4. Applying cold compresses to the area of the fracture

9. Immediate care for a sprained part of the body includes: 9. _____

   1. Placing the victim in an upright position
   2. Laying the victim flat
   3. Elevating the sprained part above the level of the heart
   4. Applying heat for two to three hours

10. The procedure used to splint upper arm fractures is similar to that used to splint a broken: 10. _____

    1. Collarbone
    2. Hip
    3. Ankle
    4. Knee

FIRST-AID TRAINING TESTS

TOPIC 4—SPINAL INJURIES

Decide which of the four answers is correct, or most nearly correct; then write the corresponding number in the blank at the right.

1. A neck injury should be suspected if an accident victim: 1. ____

   1. Has injuries to the face or head
   2. Is unconscious from an unknown cause
   3. Has been subjected to violent force in the accident
   4. All of the above

2. The symptoms of injury to the spinal cord include: 2. ____

   1. Tingling in the arms, legs, fingers, or toes
   2. Pain in the feet
   3. Increased sensitivity to pain below the injury
   4. Blurred vision

3. In caring for a person with a neck injury, the best rule to follow is: 3. ____

   1. Move the victim to a warm location as soon as possible.
   2. Roll the victim onto a board, and apply a neck splint.
   3. Do not move the victim unless it is absolutely essential to the person's safety to do so.
   4. Shake the person to determine whether the person is in pain; then apply a neck splint.

4. Which of the following statements about the use of clothing to make a neck splint is false? 4. ____

   1. Care must be taken to ensure that the pockets are empty.
   2. The ends of shirts, jackets, and the like should be brought together under the victim's chin and tied together or attached to each other in some manner.
   3. The article of clothing should be rolled into a cylindrical sphere before it is applied as a splint.
   4. None of the above.

5. A person who suffers a broken neck is likely to have problems: 5. ____

   1. Hearing
   2. Breathing
   3. Seeing
   4. Smelling

FIRST-AID TRAINING TESTS

TOPIC 5—WOUNDS, BLEEDING, AND BRUISES

Decide which of the four answers is correct, or most nearly correct; then write the corresponding number in the blank at the right.

1. The greatest danger from a puncture wound is: 1. ____

   1. Death by excessive bleeding
   2. Infection
   3. Paralysis
   4. Increased blood presssure

2. Injuries in which the top layer of skin is scraped away are called: 2. ____

   1. Punctures
   2. Abrasions
   3. Lacerations
   4. Bruises

3. If bleeding is in spurts and the color of the blood is bright red, the bleeding is probably coming from a (an): 3. ____

   1. Artery
   2. Vein
   3. Artery or vein
   4. None of the above

4. Which of the following is a recommended procedure in attempting to control bleeding? 4. ____

   1. Applying pressure with one's hand over the wound
   2. Elevating the bleeding part of the body above the level of the heart
   3. Applying a bandage or clean cloth firmly over the wound
   4. All of the above

5. A tourniquet should be used to control bleeding: 5. ____

   1. Whenever a clean cloth or similar covering is not available
   2. On any wound within 5 inches (12.7 centimetres) of the heart
   3. Whenever surrounding temperatures are too high to permit the blood to coagulate
   4. Only as a last resort

FIRST-AID TRAINING TESTS

TOPIC 6—EMERGENCIES OF THE HEART AND BLOOD CIRCULATION SYSTEM

Decide which of the four answers is correct, or most nearly correct; then write the corresponding number in the blank at the right.

1. Heart attacks do not generally occur in people under what age? 1. ____

   1. Thirty
   2. Twenty-eight
   3. Twenty-one
   4. Twenty

2. A heart attack victim is likely to experience pain in any of the following except the: 2. ____

   1. Arm
   2. Neck
   3. Leg
   4. Back

3. The best place to feel to determine whether a person is breathing is the person's: 3. ____

   1. Wrist
   2. Armpit
   3. Carotid artery
   4. None of the above

4. Most cases of injury to blood vessels occur in the: 4. ____

   1. Feet
   2. Forearms
   3. Temples
   4. Neck

5. Coldness in the injured area, bluish tissue, and numbness in the injured area are all signs of possible: 5. ____

   1. Vericose veins
   2. Injured arteries
   3. Heart palpitations
   4. All of the above

6. Shock is characterized by a reduction in the flow of blood to the: 6. ____

   1. Heart
   2. Lower body
   3. Brain
   4. Limbs

7. The skin of a person in shock is generally: 7. ____

   1. Moist and cool
   2. Warm and moist
   3. Dry and cool
   4. Warm and dry

8. Shock victims should be kept: 8. ____

   1. Warm
   2. Cool
   3. Comfortable in a sitting position
   4. Standing to increase the blood circulation

9. If a person is experiencing shortness of breath, the person should be placed in the position that allows the greatest comfort breathing, which is usually: 9. ____

1. Squatting on the toes
2. Lying down on the back
3. Sitting in a normal position
4. Lying on the side

10. The carotid artery can be found: 10. ____

1. Near the windpipe
2. Along the inside of the arm
3. Between the shoulder blades
4. Just above the knee

FIRST-AID TRAINING TESTS

TOPIC 7—BREATHING AND AIRWAY MAINTENANCE

Decide which of the four answers is correct, or most nearly correct; then write the corresponding number in the blank at the right.

1. The most serious result normally associated with stoppage of breathing is: 1. ____

   1. Heart attack
   2. Brain damage
   3. Decreased blood pressure
   4. Kidney failure

2. A choking victim who can speak, cough, or breathe should be: 2. ____

   1. Given artifical breathing
   2. Given a thrust in the stomach to loosen the object that is causing the choking
   3. Allowed to try to solve the problem himself or herself
   4. Given the Heimlich maneuver

3. The skin of a choking victim may turn what color? 3. ____

   1. Milky white
   2. Red
   3. Green
   4. Blue

4. A person's airway can be opened by: 4. ____

   1. Pinching the corners of the mouth together
   2. Placing a hand underneath the person's neck and tilting the person's head back
   3. Pressing down with both hands on the person's stomach area
   4. Prying the teeth apart with a pencil or other rigid object

5. To determine whether an obstruction can be removed from a person's throat, one should place two fingers in the victim's mouth and: 5. ____

   1. Use a sweeping motion to remove the object.
   2. Wiggle them vigorously to shake the object loose.
   3. Push downward to move the object down and out of the throat.
   4. None of the above.

6. In rescue breathing for an adult, one breath should be given every how many seconds? 6. ____

   1. Three
   2. Five
   3. Seven
   4. Nine

7. Treatment for a sucking chest wound calls for the hole in the chest to be covered: 7. ____

   1. When the person has breathed out
   2. When the person has breathed in
   3. Only after artificial breathing has been started
   4. With a filter-type material, such as gauze

8. A person who is hyperventilating should be made to: 8. ____

1. Breathe deeply.
2. Take liquids.
3. Hold his or her breath.
4. Pinch the nose closed and breathe only through the mouth.

9. Chest pains may be the result of: 9. ____

1. A collapsed lung
2. Heart trouble
3. A cracked rib
4. All of the above

10. Swelling of the lip, tongue, or throat may indicate: 10. ____

1. Hyperventilation
2. An allergic reaction
3. A blood clot
4. An asthma attack

FIRST-AID TRAINING TESTS

TOPIC 8—HEAD INJURIES, UNCONSCIOUSNESS, FAINTING, AND CONVULSIONS

Decide which of the four answers is correct, or most nearly correct; then write the corresponding number in the blank at the right.

1. Which of the following should *not* necessarily be determined about a person who has just suffered a head injury? 1. ____

   1. Did the injured person lose consciousness?
   2. Did the injured person bleed from the nose or ears?
   3. If a fall was involved, how far did the victim fall?
   4. Has this type of accident happened before on this particular jobsite?

2. Which of the following steps should be taken in treating a person for a head injury: 2. ____

   1. Be sure the victim's airway is clear.
   2. Control bleeding if bleeding is present.
   3. Check for other injuries.
   4. All of the above.

3. An unconscious person should be given: 3. ____

   1. Warm fluids
   2. Cold fluids
   3. Soft foods only
   4. No food or fluids

4. Fainting is caused by: 4. ____

   1. A brief increase in blood pressure
   2. A brief decrease in blood pressure
   3. Excessive oxygen to the brain
   4. None of the above

5. If an individual feels light-headed or dizzy or has buzzing in the ears and cannot lie down, the person should: 5. ____

   1. Lean against a building, tree, or other upright object.
   2. Sit down in a chair with his or her back straight.
   3. Sit down, and place the head between the knees.
   4. Stand as straight and tall as possible.

6. Not restricting movement, loosening restrictive clothing, and letting convulsions run their course are all steps to take with a person who is suffering or has suffered: 6. ____

   1. An epileptic seizure
   2. An allergic reaction
   3. A fainting spell
   4. An asthma attack

7. Which of the following should be given to a diabetic who is about to lose consciousness? 7. ____

1. Sugarless gum
2. Diet soda
3. Orange juice
4. Either sugarless gum or diet soda

8. A person suffering from alcohol poisoning should be treated as if the person were having: 8. ____

1. An epileptic seizure
2. A fainting spell
3. An allergic reaction
4. None of the above

9. An unconscious person who is breathing should be kept: 9. ____

1. Lying on the back
2. Lying on the side
3. Lying on the stomach
4. Sitting upright

10. A person with a head injury should be: 10. ____

1. Thrown over the shoulder to be carried
2. Carried so that the head and body move as a single unit
3. Carried by the feet and shoulders
4. Dragged by the feet only

FIRST-AID TRAINING TESTS

TOPIC 9—SHOCK

Decide which of the four answers is correct, or most nearly correct; then write the corresponding number in the blank at the right.

1. Which of the following does shock affect: 1. ____

   1. Respiration
   2. Hearing
   3. Circulation
   4. Vision

2. The symptoms of shock include: 2. ____

   1. Warm, dry skin
   2. Pale, bluish skin
   3. Cool, dry skin
   4. Regular pulse

3. The best position for a person suffering shock is: 3. ____

   1. Sitting up
   2. Sitting up with the head dropped between the knees
   3. Lying down with the feet tucked under the buttocks so that the knees are raised
   4. Lying down with the feet and legs elevated

4. A good rule to follow in attempting to keep a shock victim warm is to place: 4. ____

   1. Two layers of material on top of the victim for every layer beneath
   2. Two layers of material beneath the victim for every layer on top
   3. The same number of layers of material beneath and on top of the victim
   4. None of the above

5. Which of the following can be harmful to a shock victim? 5. ____

   1. Perspiring
   2. Vomiting
   3. Eating food or drinking fluids
   4. All of the above

FIRST-AID TRAINING TEST

TOPIC 10—MEDICAL EMERGENCIES

Decide which of the four answers is correct, or most nearly correct; then write the corresponding number in the blank at the right.

1. The symptoms of one's having swallowed a poisonous substance include all but which one of the following? 1. ____

   1. Convulsions
   2. Drowsiness
   3. Stomach pains
   4. Pain in the arm

2. If a person had ingested strong acid, what would be the best action to take in aiding the person? 2. ____

   1. Feed the person large quantities of liquids to dilute the acid.
   2. Induce vomiting.
   3. Get the person to trained medical personnel as quickly as possible.
   4. Begin rescue breathing.

3. Drugs known as "uppers" tend to: 3. ____

   1. Stimulate the user.
   2. Depress the user.
   3. Affect the user's eye-hand coordination.
   4. None of the above.

4. In which of these positions would a vomiting person be in danger? 4. ____

   1. Standing up
   2. Bending over
   3. Lying on the back
   4. Lying on the side

5. Severe chest pains may indicate: 5. ____

   1. A diabetic reaction
   2. A heart attack
   3. An obstructed airway
   4. An allergic reaction

6. A heart attack victim may experience pain in the: 6. ____

   1. Legs
   2. Arms
   3. Jaw
   4. All of the above

7. Allergic swelling may be evident in the: 7. ____

   1. Wrists
   2. Throat
   3. Ankles
   4. Thighs

8. A roofer who has been working for some time in extreme heat and who has a flushed appearance, warm skin, and rapid heartbeat is probably suffering: 8. ____

   1. A heart attack
   2. Heat exhaustion
   3. Heat stroke
   4. Hyperventilation

9. Excessive loss of salt from the body can lead to: 9. ____

1. Heat stroke
2. Heat blisters
3. Heat exhaustion
4. Swelling of the throat

10. Respiration failure, depression, and reduced activity can all be caused by: 10. ____

1. Heat stroke
2. Drugs known as "uppers"
3. Ingestion of lye
4. Drugs known as "downers"

FIRST-AID TRAINING TESTS

TOPIC 11—INJURIES TO THE EYES, EARS, AND NOSE

Decide which of the four answers is correct, or most nearly correct; then write the corresponding number in the blank at the right.

1. An unconscious person with which of the following probably has a head injury? 1. ____

   1. Swollen eyelid or eyelids
   2. Dilation of the pupil or pupils
   3. Bruises around the eye or eyes
   4. All of the above

2. If a splinter or some other foreign object enters a person's eye, the best procedure to follow is to: 2. ____

   1. Dab the eye with cotton.
   2. Wash the eye out with a commercially available eyewash.
   3. Immobilize the eye, and get the victim to trained medical personnel as soon as possible.
   4. None of the above.

3. Chemicals in the eye should be: 3. ____

   1. Flushed out with water or milk
   2. Cleaned out with cotton or gauze
   3. Washed out with hydrogen peroxide
   4. Left in the eye for a doctor or other medical practitioner to remove

4. The first thing to do in helping someone with a possible broken nose is to: 4. ____

   1. Apply warm compresses to the nose.
   2. Apply cold compresses to the nose.
   3. Transport the injured party to a medical facility.
   4. Insert cotton in the nostrils to stop the bleeding.

5. The only treatment that should be given for an ear injury prior to transporting the victim to a medical facility is to: 5. ____

   1. Apply cold to the ear.
   2. Place a bandage over the ear.
   3. Apply heat to the ear.
   4. Drain the ear with a syringe.

FIRST-AID TRAINING TESTS

TOPIC 12—BITES AND STINGS

Decide which of the four answers is correct, or most nearly correct; then write the corresponding number in the blank at the right.

1. Immediate care for an animal bite involves: 1. ____

   1. Washing the bite area with milk
   2. Washing the bite area with soap and water
   3. Washing the bite area with any nontoxic liquid
   4. Applying cold to the bite area to reduce swelling

2. A black widow spider can be recognized by: 2. ____

   1. Its glossy body and red marking on the underside
   2. Its long, black, hairy legs
   3. The sharp point on its tail
   4. Its red body with black marking on the underside

3. The only treatment that should be given for a spider bite before transporting the victim to a medical facility is to: 3. ____

   1. Apply cold compresses.
   2. Apply warm compresses.
   3. Give the victim large quantities of quinine water.
   4. Suck the bite area to remove any poison.

4. The greatest danger from a tick bite is: 4. ____

   1. Rabies
   2. Disease
   3. Infection
   4. Blindness

5. Multiple stings from bees, wasps, yellow jackets, and so on can cause: 5. ____

   1. Nausea
   2. Headache
   3. Fever
   4. All of the above

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